# GM29
# Integrator's Manual

Sony Ericsson

CE

The product described in this manual conforms to the Radio and Telecommunication Terminal Equipment (R&TTE) directive 99/5/EC with requirements covering EMC directive 89/336/EEC and Low Voltage directive 73/23/EEC. The product fulfils the requirements according to 3GPP TS 51.010-1, EN 301 489-7 and EN60950.

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## Third edition (September 2003)

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# *Part 1: Overview*

# 1. Introduction

## *1.1 Target Users*

GM29 modems are designed to be integrated into machine-machine or man-to-machine communications applications. They are intended to be used by manufacturers, system integrators, applications developers and developers of wireless communications equipment.

## *1.2 Prerequisites*

It is assumed that the person integrating the GM29 into an application has a basic understanding of the following:

- GSM networking;
- Wireless communication and antennas (aerials);
- AT commands;
- ITU-T standard V.24/V.28;
- Micro controllers and programming;
- Electronic hardware design.

## *1.3 Manual Structure*

The manual is composed of four parts:

*Part 1- Overview*

This section provides a broad overview of the GM29 and includes a list of abbreviations used in the manual.

*Part 2 - Integrating the Modem*

This section describes each of the signals available on the GM29 modem, along with mechanical information. The section also provides you with design guidelines and explains what is needed to commercialise an application from a regulatory point of view.

*Part 3 - Using AT Commands*

This section lists all the AT commands relevant to the GM29, including their associated parameters. The purpose of part 4 is to give you detailed information about the function of each command in the AT command set.

# 2. GM29 Modem

## *2.1 Description*

The dual band EGSM 900/1800 MHz GM29 is a GSM/GPRS serial modem. The modem is a powerful and flexible device that can be used in a wide range of telemetry and telematics applications that rely on the remote exchange of data, voice, SMS or faxes via the GSM cellular network.

Small and lightweight, the GM29 has standard connectors and an integral SIM card reader making it easy and quick to integrate. As well as providing a standard RS232 serial communication interface the GM29 also has an audio interface allowing an analogue handset to be connected. When the GM29 is integrated into an external application, a wireless communications system is created.

A typical end-to-end system consists of a micro controller in an external application communicating, via the GM29 modem, with a remote terminal or host using the GSM network. The micro controller uses a set of AT commands to control the modem, and to set up the end-to-end communications link, via its 9-way RS232 serial interface.

GM29 serial modems are intended to be used by manufacturers, system integrators, application developers and developers of a wide range of equipment and business solutions, typically in the following fields:

- Security and alarms
- Vending
- Monitoring and control
- Utilities
- Fleet Management

## *2.2 Highlights*

- Dual band, EGSM 900/1800 MHz, GSM/GPRS serial modem
- Flexible plug-and-play device
- Data: GPRS, HSCSD, CSD, SMS
- Voice: full rate, enhanced full rate, half rate
- SMS: mobile-originated, mobile-terminated, cell broadcast
- Fax: Group 3, Classes 1 & 2
- RS232 9-way serial interface
- 5 V - 32 V d.c. input
- 4-wire audio connection
- Antenna connection (FME male)
- R&TTE type approved

## *2.3 GM29 in a Communication System*

Figure 2.1 illustrates the main blocks of a wireless communication system using the GM29. It also shows the communication principles of the system. The definitions in the figure, as used elsewhere in this manual, are in accordance with the recommendations of GSM 07.07.

- The MS (mobile station) represents the GM29 modem plus SIM card. The modem excluding SIM card, is known as the ME (mobile equipment).
- The TE (terminal equipment) is a micro-controller (i.e., a computer) and is a part of the application.

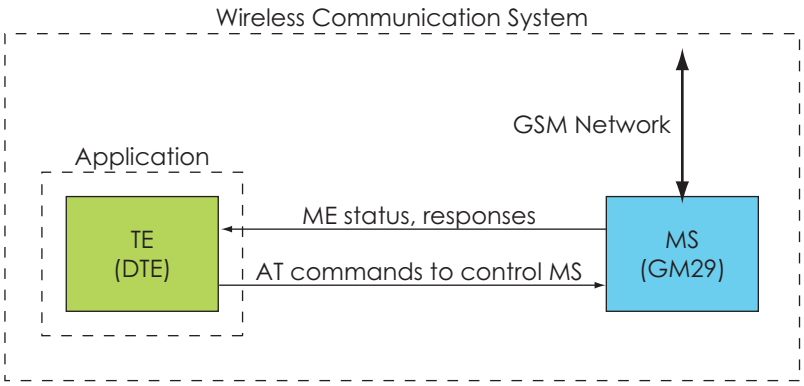



*Figure 2.1 Main Blocks in a Wireless System*

In accordance with the recommendations of ITU-T (International Telecommunication Union - Telecommunications Standardisation Sector) V.24, the TE communicates with the MS over a serial interface.

The functions of the GM29 follow the recommendations provided by ETSI (European Telecommunications Standards Institute) and ITU-T.

ETSI specifies a set of AT commands for controlling the GSM element of the modem; these commands are supplemented by Sony Ericsson specific commands.

To find out how to work with AT commands, see “Part 3: Using AT Commands”, page 51.

Figure 2.2 illustrates the interface between the modem and the application. The entire System Connector Interface is described in detail in "Electrical Description", page 28.

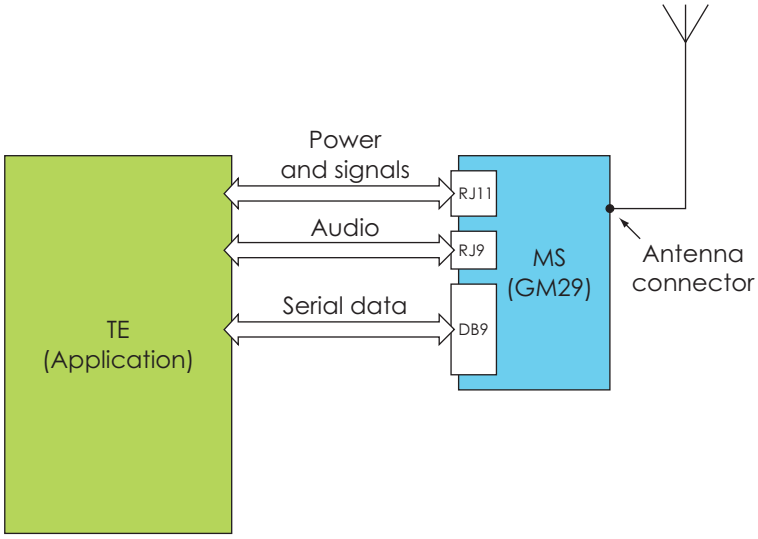



*Figure 2.2 The Interface between the modem and the Application*

***Note!*** ITU-T standards define TE and TA as DTE (Data Terminal Equipment) and DCE (Data Circuit Terminating Equipment) respectively.

## *2.4 Main Features and Services*

The modem performs a set of telecom services (TS) according to GSM standard phase 2+, ETSI and ITU-T. The services and functions of the modem are implemented by issuing AT commands over the RS232 serial interface.

### 2.4.1 Types of Mobile Station

The GM29 is a dual band serial modem with the GSM radio characteristics shown in the table below.

| *GM29* | *GSM900* | *E-GSM900* | *GSM1800* |
|---|---|---|---|
| Frequency Range (MHz) | TX: 890-915<br>RX: 935-960 | TX: 880-890<br>RX: 925-935 | TX: 1710-1785<br>RX: 1805-1880 |
| Channel spacing | 200 kHz | | 200 kHz |
| Number of channels | 173 carriers *8 (TDMA)<br>GSM: channels 1 to 124<br>E-GSM: channels 975 to 1023 | | 374 carriers *8 (TDMA)<br>DCS: channels 512 to 885 |
| Modulation | GMSK | | GMSK |
| TX phase accuracy | < 5º RMS phase error (burst) | | < 5º RMS phase error (burst) |
| Duplex spacing | 45 MHz | | 95 MHz |
| Receiver sensitivity at antenna connector | < –102 dBm | | < –102 dBm |
| Transmitter output power at antenna connector | Class 4<br>2 W (33 dBm) | | Class 1<br>1 W (30 dBm) |
| Automatic hand-over between GSM 900 and GSM 1800 | | | |

### 2.4.2 Short Message Service

The modem supports the following SMS services:

- Sending; MO (mobile-originated) with both PDU (protocol data unit) and text mode supported.
- Receiving; MT (mobile-terminated) with both PDU and text mode supported.
- CBM (cell broadcast message); a service in which a message is sent to all subscribers located in one or more specific cells in the GSM network (for example, traffic reports). This feature is network dependent.
- SMS STATUS REPORT according to GSM 03.40.
- SMS COMMAND according to GSM 03.40.

The maximum length of an SMS message is 160 characters when using 7-bit encoding. For 8-bit data, the maximum length is 140 characters. The modem supports up to 6 concatenated messages to extend this function.

### 2.4.3 Voice Calls

The GM29 offers the capability of mobile originated and mobile terminated voice calls, as well as supporting emergency calls. Multi-party, call waiting and call deflection features are available. Some of these features are network-operator specific.

For the inter-connection of audio, the modem offers a balanced 4-wire analogue interface.

DTMF (Dual Tone Multi Frequency) is supported.

### 2.4.4 Data

The modem supports the following data protocols:

- GPRS (General Packet Radio Service).
  Modems are Class B terminals, which provide simultaneous activation and attachment of GPRS and GSM services. GM29 modems are GPRS class 8 (4+1) enabled devices, which are capable of transmitting in one timeslot per frame (up link), and receiving at a maximum of four timeslots per frame (down link).
- CSD (Circuit Switched Data).
  GM29 modems are capable of establishing a CSD communication at 9.6kbps.
- HSCSD (High Speed Circuit Switched Data).
  GM29 supports HSCSD class 2 (2+1) communication, with one timeslot per frame capacity in the up link and two timeslots per frame capacity in the down link.

### 2.4.5 Fax

The GM29 allows fax transmissions to be sent and received by commercial software installed on the application computer. Group 3 fax Classes 1 and 2 are supported.

### 2.4.6 Supplementary Services

- Call forwarding
- Call hold, waiting and multiparty
- Calling/called number identification
- Advice of charge
- USSD
- Alternate line service
- Customer service profile
- Preferred networks
- Operator selection

- Network registration
- Call barring
- Call transfer

### 2.4.7 Serial Communication

The GM29 enables an end-to-end communication path to be established between the external telemetry/telematics application and a remote terminal or host, via the GSM network. Once a path has been set up, voice or data communication can take place. Serial data with flow control according to the RS232 signalling protocol operates between the modem and the external application.

Control of the GM29 is by the external application, via the RS232 serial interface, using a set of AT commands. The GM29 supports the full set of AT commands according to GSM 07.05 and GSM 07.07. It also supports an extended set of Ericsson proprietary AT commands to add extra functionality.

AT commands are used to operate the modem and have a broad range of functions including:

- configuring general parameters of the GM29;
- setting up and controlling communications to and from the GSM network;
- configuring the modem to communicate across the RS232 serial interface;
- and obtaining GSM network status information.

For more detail on the AT commands supported by the GM29 see “Alphabetical Listing of AT Commands”, page 259.

### 2.4.8 Interfacing with the GM29

The GM29 uses the following industry standard connectors to interface with the external application and the GSM network;

- RJ11 (plug-in power supply connector)
- RJ9 (handset audio connector)
- Integral SIM card reader
- FME male (antenna connector)
- Sub-D socket, 9 pin (RS232 serial port)

## *2.5 Service and Support*

To contact customer support please use the details below:

Customer Support
Sony Ericsson Mobile Communications
Maplewood Building
Chineham Business Park
Basingstoke
RG24 8YB

E-mail: modules.support@sonyericsson.com
or
modules.info@sonyericsson.com

Information about Sony Ericsson and its products is available on the following web site:

http://www.sonyericsson.com/M2M

# 3. Abbreviations

| *Abbreviation* | *Explanations* |
|---|---|
| CBM | Cell Broadcast Message |
| CBS | Cell Broadcast Service |
| CSD | Circuit Switched Data |
| DCE | Data Circuit Terminating Equipment |
| DTE | Data Terminal Equipment |
| DTMF | Dual Tone Multi Frequency |
| EFR | Enhanced Full Rate |
| EMC | Electro-Magnetic Compatibility |
| ETSI | European Telecommunication Standards Institute |
| FR | Full Rate |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communication |
| HR | Half Rate |
| HSCSD | High Speed Circuit Switched Data |
| ITU-T | International Telecommunication Union - Telecommunications Standardisation Sector |
| ME | Mobile Equipment |
| MO | Mobile Originated |
| MS | Mobile Station |
| MT | Mobile Terminated |
| PDU | Protocol Data Unit |
| RLP | Radio Link Protocol |
| RF | Radio Frequency |
| RTC | Real Time Clock |
| SIM | Subscriber Identity Module |
| SMS | Short Message Service |
| TA | Terminal Adapter |
| TE | Terminal Equipment |
| TS | Telecom Services |

# *Part 2: Integrating the Modem*

# 1. Mechanical Description

## *1.1 Overview*

The pictures below show the mechanical design of the GM29 along with the positions of the different connectors and mounting holes. The GM29 case is made of durable PC/ABS plastic.

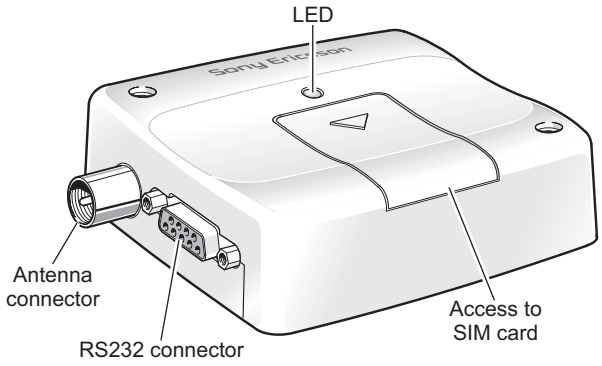



*Figure 1.1 GM29 viewed from the left side*

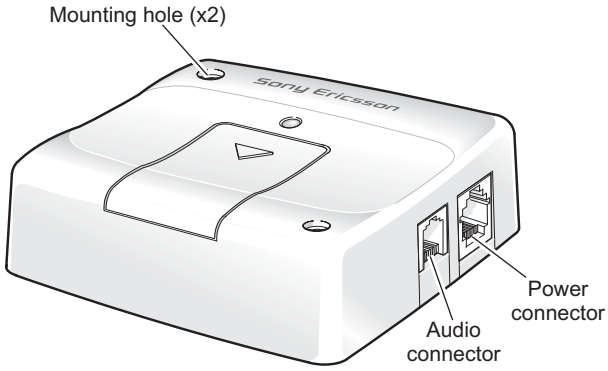
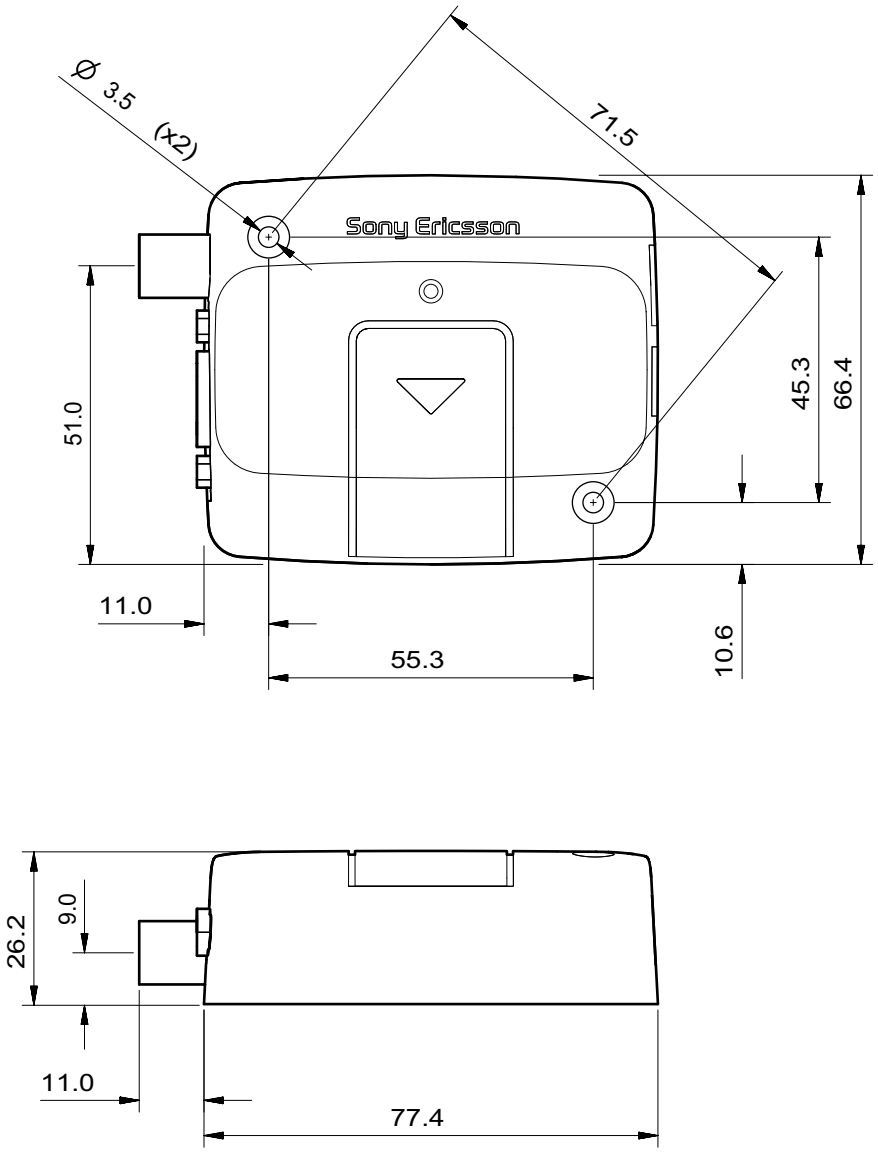



*Figure 1.2 GM29 viewed from the right side*

Please note the following:

- Mounting holes positioned at two of the corners make it possible to securely bolt the modem into your application.
- Keypad, display, microphone, speaker and battery are not part of the modem.
- The SIM card is mounted in the modem.
- The pins and electrical characteristics or the modem's various connectors are described in "2. Electrical Description", page 28.
- Information about the antenna connector is found in "2.3 Antenna Connector", page 31.

## *1.2 Physical Dimensions*




Measurements are given in millimetres. See also “Technical Data”, page 45.

# 2. Electrical Description

All electrical connections to the GM29 are protected in compliance with the standard air (4 kV) and contact (8 kV) discharge ESD tests, of EN 301 489-1.

The modem uses the following industry standard connectors:

- RJ11 6-way (power connector)
- RJ9 4-way (handset connector)
- SIM card reader
- FME male coaxial jack (antenna connector)
- Sub-D socket, 9 pin (RS232 serial port)

## *2.1 Power Connector*

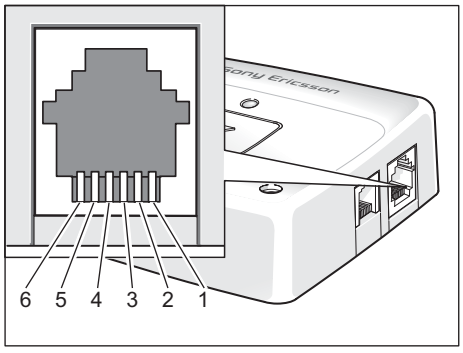
An RJ11 6-way connector, as shown and described below, serves as a means of supplying and controlling d.c. power to the modem.

The supply voltage, VCC, required by the modem is in the range 5 V - 32 V d.c. Application of the supply voltage does not switch the modem on. To do so an additional active-high control signal, TO_IN, must be applied for > 0.2 s.

A second active-high control signal, HR_IN, can be used to switch the modem off when applied for 1 - 2 seconds, or can be used to perform a hardware reset when applied for > 3.5 s.

TO_IN and HR_IN are referenced to GND (pin 6 on the connector).

VCC and GND are reverse polarity and overvoltage protected.




| | | |
|---|---|---|
| 1 VCC | 3 HR_IN | 5 n/c |
| 2 n/c | 4 TO_IN | 6 GND |

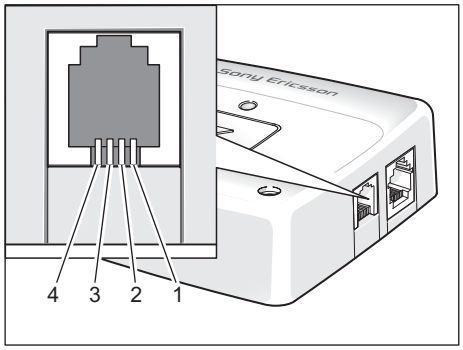
The power connector electrical characteristics are listed below:

| *Pin* | *Signal* | *Dir* | *Limits* | *Description* |
|---|---|---|---|---|
| 1 | VCC | I | 5 - 32 V | Positive power input |
| 2 | - | - | - | No connection |
| 3 | HR_IN | I | –0.5 - 32 V | Active high control line used to switch off or reset the modem<br>$V_{IH}$ > 5 V, $V_{IL}$ < 2 V<br>Power off: 1 s < t < 2 s<br>Hard reset: t > 3.5 s |
| 4 | TO_IN | I | –0.5 - 32 V | Active high control line used to switch on the modem<br>$V_{IH}$ > 5 V, $V_{IL}$ < 2 V<br>Power on: t > 0.2 s |
| 5 | - | - | - | No connection |
| 6 | GND | I | - | Negative power (ground) input and return path for TO_IN and HR_IN |

## *2.2 Audio Connector*

A 4-way RJ9 connector, as shown below, allows a telephone handset to be plugged into the modem, giving access to the microphone and earpiece signals. The connector may also be used to drive other analogue audio sub-systems or devices.

Although the GM29 is pre-configured to work with a range of handsets, the audio interface is flexible and its performance can be configured, using AT commands, to match a particular handset or audio subsystem.




1 MICN 3 BEARP
2 BEARN 4 MICP

Audio signal descriptions are listed below:

| *Pin* | *Signal* | *Dir* | *Description* |
|---|---|---|---|
| 1 | MICN | I | Microphone negative input |
| 2 | BEARN | O | Earpiece negative output |
| 3 | BEARP | O | Earpiece positive output |
| 4 | MICP | I | Microphone positive input |

MICP and MICN are balanced differential microphone input signals. These inputs are compatible with an electret microphone.

BEARP and BEARN are the speaker output signals. These are differential-mode outputs. The electrical characteristics are given in the table below.

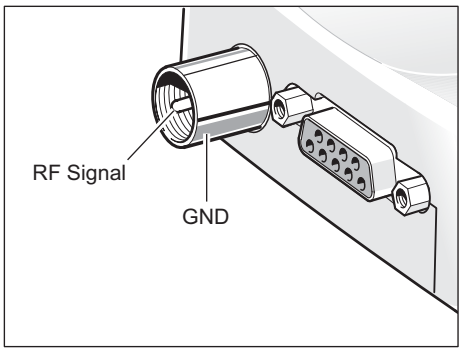
| *Parameter* | *Limit* |
|---|---|
| Output level (differential) | ≥4.0 $V_{pp}$ |
| Output level (dynamic load = 32 Ω) | ≥2.8 $V_{pp}$ |
| Distortion at 1 kHz and maximum output level | ≤5% |
| Offset, BEARP to BEARN | ±30 mV |
| Ear-piece mute-switch attenuation | ≥40 dB |

The following table shows the ear piece impedances that can be connected to BEARP and BEARN.

| *Ear piece model* | *Impedance* | *Tolerance* |
|---|---|---|
| Dynamic ear piece | [32 Ω + 800 µH] // 100 pF | ±20% |
| Dynamic ear piece | [150 Ω + 800 µH] // 100 pF | ±20% |
| Piezo ear piece | 1 kΩ + 60 nF | ±20% |

## *2.3 Antenna Connector*

The antenna connector allows transmission of radio frequency (RF) signals between the modem and an external customer-supplied antenna. The modem is fitted with a 50Ω, FME male coaxial jack as shown below.

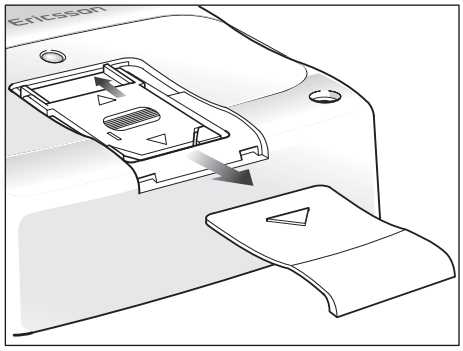


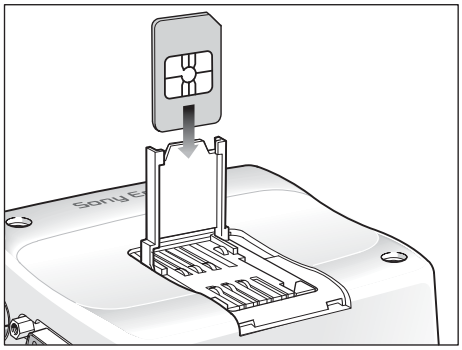

The table below shows the antenna electrical characteristics:

| *Parameter* | *Limit* | *Description* |
|---|---|---|
| Nominal impedance | 50Ω (SWR better than 2.5:1) | |
| Output Power | 2 Watt peak (Class 4) | Extended GSM900 |
| | 1 Watt peak (Class 1) | GSM1800 |
| Static Sensitivity | Better than –102dBm | Extended GSM900 |
| | Better than –102dBm | GSM1800 |

## *2.4 SIM Card Reader*

The GM29 is fitted with a SIM card reader designed for 3 V and 5 V SIM cards. It is the flip-up type which is lockable in the horizontal position and is accessed through a removable panel as shown below.

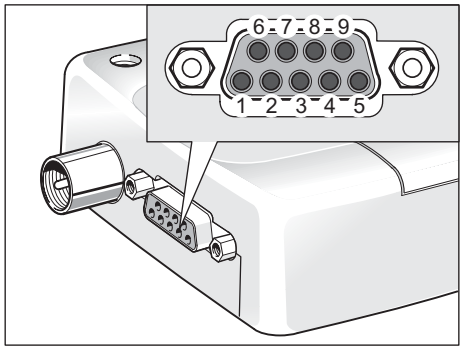


The SIM card reader includes a SIM presence switch. This ensures that when a SIM card is inserted or removed while the GM29 is turned ON, it will reset.

## *2.5 RS232 Serial Port*

The modem supports a standard RS232 serial interface (EIA/TIA 574) via its 9 pin Sub-D connector, shown below. In line with serial communication terminology the GM29 serial modem should be considered as the *data circuit-terminating equipment* (DCE) and the external application or computer as the *data terminating equipment* (DTE).




1 DCD
2 RD
3 TD
4 DTR
5 GND
6 DSR
7 RTS
8 CTS
9 RI

The electrical characteristics of the serial port signals are shown below:

| *Pin* | *Signal* | *Dir* | *Voltage levels* | *Description* |
|---|---|---|---|---|
| 1 | DCD | O | > +4 V<br>< –4 V | Data carrier detect |
| 2 | RD | O | > +4 V<br>< –4 V | Received data |
| 3 | TD | I | > 2 V<br>< 0.8 V | Transmitted data |
| 4 | DTR | I | > 2 V<br>< 0.8 V | Data terminal ready |
| 5 | GND | - | 0 V | Ground connection |
| 6 | DSR | O | > +4 V<br>< –4 V | Data set ready |
| 7 | RTS | I | > 2 V<br>< 0.8 V | Request to send |
| 8 | CTS | O | > +4 V<br>< –4 V | Clear to send |
| 9 | RI | O | > +4 V<br>< –4 V | Ring indicator |

### 2.5.1 Serial Data

The modem supports the standard data character format of 1 start bit, 8 bit data, no parity plus 1 stop bit, in total 10 bits per character.

### 2.5.2 Serial Data Signals - RD, TD

The default baud rate is 9.6 kbps, however higher bit rates up to 460 kbps are supported. At start-up the GM29 transmits and receives data at the default rate of 9.6 kbps in either standard AT mode or binary mode (the first received data - AT or binary format - determines the operating mode). When reprogramming, the transmission rate is automatically negotiated by the programming application. Speeds up to 460 kbps are supported.

*Serial Data From Modem (RD)*

RD is an output signal that the modem uses to send data to the application.

*Serial Data To Modem (TD)*

TD is an input signal, used by the application to send data to the modem.

### 2.5.3 Control Signals - RTS, CTS, DTR, DSR, DCD, RI

RTS and CTS are capable of transmitting at 1/10th of the data transmission speed for data rates up to 460 kbps (byte-oriented flow control mechanism).

*Request to Send (RTS)*

Used to condition the DCE for data transmission. The default level is high by internal pull up.

The exact behaviour of RTS is defined by an AT command. Software or hardware control can be selected. Hardware flow is the default control.

The application must pull RTS low to communicate with the modem. The modem will respond by asserting CTS low, indicating it is ready for communication.

*Clear To Send (CTS)*

CTS indicates that the DCE is ready to transmit data. The default level is high. You can define the exact behaviour of CTS through an AT command, and can select software or hardware flow control.

*Data Terminal Ready (DTR)*

DTR indicates that the DTE is ready to transmit and receive data. It also acts as a hardware ‘hang-up’, terminating calls when switched high. The signal is active low. You can define the exact behaviour of DTR with an AT command.

The DTR line can also be used to switch on the modem when activated for 0.2 seconds. The DTR line must be deactivated prior to switching off the modem to ensure it switches off (powers down) correctly.

*Data Set Ready (DSR)*

An active DSR signal is sent from the modem to the application (DTE) to confirm that a communications path has been established. DSR has two modes of operation, settable using the AT command AT&S.

*Data Carrier Detect (DCD)*

DCD indicates that the DCE is receiving a valid carrier (data signal) when low. You can define the exact behaviour of DCD with an AT command.

*Ring Indicator (RI)*

RI indicates that a ringing signal is being received by the DCE when low. You can define the exact behaviour or RI with an AT command.

## *2.6 Real Time Clock*

The GM29 contains a real time clock (RTC) to maintain accurate timekeeping and to enable “timestamping” of messages.

The RTC is powered when d.c. power is connected to the modem AND the modem is switched on. If the d.c. supply fails, a stored energy device within the GM29 provides back-up power to maintain the RTC for at least 12 hours.

## *2.7 Software Updates*

It is possible and sometimes necessary to update the GM29 software. Updates must be carried out by a Sony Ericsson approved technician. Please contact your supplier for details (see “Service and Support”, page 9).

# 3. Operation

## *3.1 Switching On the Modem*

There are two ways to switch on the modem, once power is applied.

- either assert TO_IN high for > 0.2 s;
- or activate the RS232 control line DTR, high for > 0.2 s.

The modem is fully operational after 4 seconds. Logging onto a network may take longer than this and is outside the control of the modem.

The modem can be configured to start up at the time power is applied by permanently tying power connector signals TO_IN (pin 4) and VCC (pin 1) together. In this case DTR must be used to switch the modem on again after it has been switched off or reset, while power is still applied.

***Note!*** DTR must be cycled from low to high.

## *3.2 Switching Off the Modem*

There are three ways to switch off (power down) the modem as described below:

- either use the AT+CFUN command;
- or assert HR_IN high for 1 - 2 seconds. A delay of up to 10 s is experienced as the modem logs off the network
- or assert TO_IN low to high for 1 - 2 seconds.

***Note!*** The DTR line must be deactivated prior to switching off the modem to ensure the unit switches off correctly.

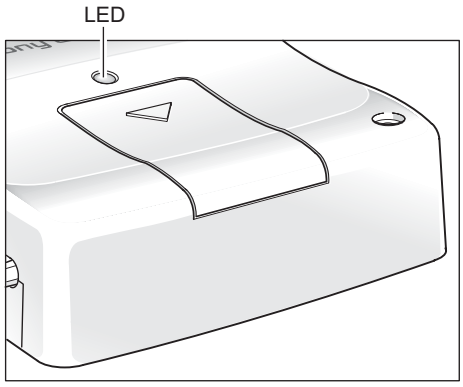
## *3.3 Resetting the Modem*

A full system reset, independent of the status of the software, may be applied to the modem as follows:

- assert HR_IN high for > 3.5 s.

## *3.4 Operating States/LED*

The modem has a green LED, as depicted below, which is used to indicate various operating states. These states are described in following table.




| *Operating State* | *LED Status* |
|---|---|
| After switching on the modem | On after 4 s |
| Switch off (Power down) or power removed | Off |
| Standby or talk | Flashing |
| No network, network search, no SIM card, no PIN entered | On |

***Notes!*** Switch off (Power Down): DC power is applied but the modem is switched OFF.

Standby: The GM29 is switched ON and camped on to the network. No call in progress.

Talk: The GM29 is switched ON and a voice/data call is in progress.

# 4. Safety and Product Care

Please read the information in this section and the information in "Installation of the Modem", page 40 before starting your integration work.

## *4.1 Safety Instructions*

PLEASE READ THESE SAFETY INSTRUCTIONS AND KEEP A COPY OF THEM.

- Always ensure that use of the modem is permitted. The modem may present a hazard if used in proximity to personal medical electronic devices. As a rule, the modem must not be used in hospitals, airports or planes.
- Never use the modem at a gas station, refuelling point, blasting area or in any other environment where explosives may be present.
- Operating the modem close to other electronic devices, such as antennas, television sets, and radios may cause electromagnetic interference.
- This product is intended to be used with the antenna or other radiating element at least 20 cm away from any part of the human body. In applications where this rule cannot be applied, the application designer is responsible for providing the SAR measurement test report and declaration.
- You are responsible for observing your country's safety standards, and where applicable, the relevant wiring rules.

## *4.2 General Precautions*

- The GM29 as a stand alone item is designed for indoor use only. To use outside it must be integrated into a weatherproof enclosure. Do not exceed the environmental and electrical limits as specified in "Technical Data", page 45.
- Avoid exposing the modem to lighted cigarettes, naked flames or to extreme hot or cold temperature.
- Never try to dismantle the modem yourself. There are no components inside the modem that can be serviced by the user. If you attempt to dismantle the modem, you may invalidate the warranty.
- The GM29 must not be installed or located where the surface temperature of the plastic case may exceed 85°C.
- All cables connected to the GM29 must be secured or clamped, immediately adjacent to the modem's connectors, to provide strain relief and to avoid transmitting excessive vibration to the modem in the installation.

- Ensure the d.c. cable, supplying power to the GM29, does not exceed 3 metres. For longer distances please contact Sony Ericsson Service and Support.
- To protect power supply cables and meet the fire safety requirements when the unit is powered from a battery or a high current supply, connect a fast 1.25A fuse in line with the positive supply.
- Do not connect any incompatible component or product to the GM29.

***Note!*** Sony Ericsson may refuse warranty claims where evidence of product misuse is found.

## *4.3 SIM Card Precautions*

- Before handling the SIM card in your application, ensure that you are not charged with static electricity. Use proper precautions to avoid electrostatic discharges.
- When the SIM card hatch is opened, the SIM card connectors lie exposed under the SIM card holder.

***Caution!*** Do not touch these connectors! If you do, you may release an electrical discharge that could damage the modem or the SIM card.

- When designing your application, the SIM card's accessibility should be taken into account. We always recommend that you have the SIM card protected by a PIN code. This will ensure that the SIM card cannot be used by an unauthorized person.

## *4.4 Antenna Precautions*

- If the antenna is to be mounted outside, consider the risk of lightning. Follow the instructions provided by the antenna manufacturer.
- Never connect more than one modem to a single antenna. The modem can be damaged by radio frequency energy from the transmitter of another modem.
- Like any mobile station, the antenna of the modem emits radio frequency energy. To avoid EMI (electromagnetic interference), you must determine whether the application itself, or equipment in the application's proximity, needs further protection against radio emission and the disturbances it might cause. Protection is secured either by shielding the surrounding electronics or by moving the antenna away from the electronics and the external signals cable.
- The modem and antenna may be damaged if either come into contact with ground potentials other than the one in your application. Beware, ground potential are not always what they appear to be.

# 5. Installation of the Modem

This chapter gives you advice and helpful hints on how to integrate the GM29 into your application from a hardware perspective.

Please read the information given in "Safety and Product Care", page 38 and then the read the information in this section before starting your integration work.

## *5.1 Where to Install the Modem*

There are several conditions which need to be taken into consideration when designing your application as they might affect the modem and its function. They are:

### 5.1.1 Environmental Conditions

The modem must be installed so that the environmental conditions stated in the Technical Data chapter, such as temperature, humidity and vibration are satisfied. Additionally, the electrical specifications in the Technical Data section must not be exceeded.

### 5.1.2 Signal Strength

The modem has to be placed in a way that ensures sufficient signal strength. To improve signal strength, the antenna can be moved to another position. Signal strength may depend on how close the modem is to a radio base station. You must ensure that the location at which you intend to use the modem, is within the network coverage area.

Degradation in signal strength can be the result of a disturbance from another source, for example an electronic device in the immediate vicinity. More information about possible communication disturbances can be found in section 5.3.5, page 43.

When an application is completed, you can verify signal strength by issuing the AT command AT+CSQ. See "AT+CSQ Signal Strength", page 88.

***Tip!*** Before installing the modem, use an ordinary mobile telephone to check a possible location for it. In determining the location for the modem and antenna, you should consider signal strength as well as cable length

### 5.1.3 Connection of Components to GM29

The integrator is responsible for the final integrated system. Incorrectly designed or installed, external components may cause radiation limits to be exceeded. For instance, improperly made connections or improperly installed antennas can disturb the network and lead to malfunctions in the modem or equipment.

### 5.1.4 Network and Subscription

- Before your application is used, you must ensure that your chosen network provides the necessary telecommunication services. Contact your service provider to obtain the necessary information.
- If you intend to use SMS in the application, ensure this is included in your (voice) subscription.
- Consider the choice of the supplementary services described in section “2.4.2 Short Message Service”, page 17.

## *5.2 How to Install the Modem*

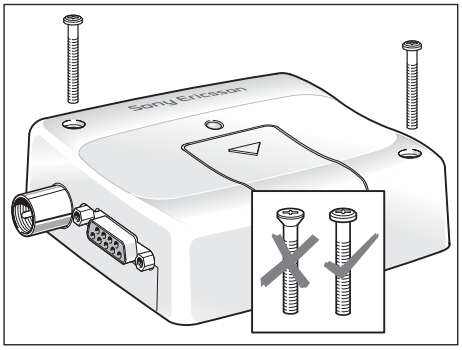
### 5.2.1 Power Supply

- Use a high-quality power supply cable with low resistance. This ensures that the voltages at the connector pins are within the allowed range, even during the maximum peak current.
- When the unit is powered from a battery or a high current supply, connect a fast 1.25A fuse in line with the positive supply. This protects the power cabling and modem.

### 5.2.2 Securing the modem

- Before securing the modem take into account the amount of additional space required for the mating connectors and cables that will be used in the application.
- Where access is restricted, it may be easier to connect all the cables to the modem prior to securing it in the application.
- Securely attach the GM29 modem to the host application using two 3 mm diameter pan-head screws of appropriate length as shown below.

***Caution!*** Do not exceed a torque of 25 Ncm when tightening the fixings screws. Excessive torque applied to the screws can crack the plastic case.




## *5.3 Antenna*

### 5.3.1 General

The antenna is the component in your system that maintains the radio link between the network and the modem. Since the antenna transmits and receives electromagnetic energy, its efficient function will depend on:

- the type of antenna (for example, circular or directional);
- the placement of the antenna;
- communication disturbances in the vicinity in which the antenna operates.

In the sections below, issues concerning antenna type, antenna placement, antenna cable, and possible communication disturbances are addressed.

In any event, you should contact your local antenna manufacturer for additional information concerning antenna type, cables, connectors, antenna placement, and the surrounding area. You should also determine whether the antenna needs to be grounded or not. Your local antenna manufacturer might be able to design a special antenna suitable for your the application.

### 5.3.2 Antenna Type

Make sure that you choose the right type of antenna for the modem. Consider the following requirements:

- the antenna must be designed for the dual frequency bands in use: EGSM/GSM900/1800;
- the impedance of the antenna and antenna cable must be 50Ω;
- the antenna output-power handling must be a minimum of 2 W;

- the VSWR value should be less than 3:1 to avoid damage to the modem.

### 5.3.3 Antenna Placement

The antenna should be placed away from electronic devices or other antennas. The recommended minimum distance between adjacent antennas, operating in a similar radio frequency band, is at least 50 cm.

If signal strength is weak, it is useful to face a directional antenna at the closest radio base station. This can increase the strength of the signal received by the modem.

The modem's peak output power can reach 2 W. RF field strength varies with antenna type and distance. At 10 cm from the antenna the field strength may be up to 70 V/m and at 1m it will have reduced to 7 V/m.

In general, CE-marked products for residential and commercial areas, and light industry can withstand a minimum of 3 V/m.

### 5.3.4 The Antenna Cable

Use 50Ω impedance low-loss cable and high-quality 50Ω impedance connectors (frequency range up to 2 GHz) to avoid RF losses. Ensure that the antenna cable is as short as possible.

The Voltage Standing-Wave Ratio (VSWR) may depend on the effectiveness of the antenna, cable and connectors. In addition, if you use an adapter between the antenna cable and the antenna connector, it is crucial that the antenna cable is a high-quality, low-loss cable.

Minimize the use of extension cables, connectors and adapters. Each additional cable, connector or adapter causes a loss of signal power.

### 5.3.5 Possible Communication Disturbances

Possible communication disturbances include the following:

- **Noise** can be caused by electronic devices and radio transmitters.
- **Path-loss** occurs as the strength of the received signal steadily decreases in proportion to the distance from the transmitter.
- **Shadowing** is a form of environmental attenuation of radio signals caused by hills, buildings, trees or even vehicles. This can be a particular problem inside buildings, especially if the walls are thick and reinforced.
- **Multi-path fading** is a sudden decrease or increase in the signal strength. This is the result of interference caused when direct and reflected signals reach the antenna simultaneously. Surfaces such as buildings, streets, vehicles, etc., can reflect signals.

- **Hand-over** occurs as you move from one cell to another in the GSM network. Your mobile application call is transferred from one cell to the next. Hand-over can briefly interfere with communication and may cause a delay, or at worst, a disruption.

## *5.4 Accessories*

The GM29 has been type approved together with a range of accessories including:

1. AC-DC Power Adaptor with customised d.c. lead
   (Model # AD-0901000BS)
   Input: 230 Va.c., 50 Hz, 2 m mains lead (UK and Euro plug options)
   Output: 9 Vd.c., 1 A. 2 m d.c. lead with RJ11 connector. CE marked.

2. Dual Band Minimag Antenna (900/1800 MHz)
   (Model # 1140.26-FME/F)
   Magnetic-mount antenna, 0 dB radiator, 2.6 m RG174 cable with FME female connector.

3. Dual Band Antenna (900/1800 MHz)
   (Model # EHD1890-FME/F)
   Bulkhead-mount antenna, 0 dB radiator, 0.8 m low loss cable with FME female connector.

4. RS232 9-way Serial Cable
   (Model # C-E-RS232-2M)
   2 m, 9-way cable, DB9 (female) to DB9 (male) connectors.

Please contact Sony Ericsson distribution channels for availability.

# 6. Technical Data

*Data Features*

| | |
|---|---|
| CSD | Up to 9.6kbps |
| HSCSD (2+1) | Up to 19.2kbps |
| GPRS Class B (4+1)<br>- P channels<br>- Coding schemes CS1 - CS4 | 85.6kbps (subject to network support and terminal location) |
| GSM | 07.10 multiplexing protocol |

*Short Message Service Features*

| | |
|---|---|
| SMS | Text and PDU |
| | Point to point (MT/MO) |
| | Cell broadcast |
| | concatenation of up to 6 SMS |

*Voice Features*

| | |
|---|---|
| | Full Rate, Enhanced Full Rate and Half Rate (FR/ EFR/HR) |
| | Dual Tone Multi Frequency (DTMF |

*Fax Features*

| | |
|---|---|
| | Group 3 |
| | Class 1 and 2 |

*Data Storage*

| | |
|---|---|
| SMS storage capacity | 40 in ME<br>In addition, the unit can handle as many SMS as the SIM can store |
| Phone book capacity | 100 |

*Power Supply*

| | |
|---|---|
| Supply voltage range | 5 - 32 V d.c. |

*Power Consumption*

| *Supply voltage* | | *5V* | | *12V* | | *32V* | | *Vdc* |
|---|---|---|---|---|---|---|---|---|
| Power Down Mode | | | | | | | | |
| | | *Av* | *Max* | *Av* | *Max* | *Av* | *Max* | |
| | | 5 | 15 | 5 | 15 | 20 | 50 | µA |
| Standby Mode (typical) | | | | | | | | |
| *Frequency* | *Paging rate* | *Av* | *Peak* | *Av* | *Peak* | *Av* | *Peak* | |
| 900 MHz | 2 | 26 | 110 | 9 | 43 | 6 | 20 | mA |
| 1800 MHz | 2 | 26 | 120 | 9 | 45 | 6 | 19 | mA |
| Talk Mode (typical) | | | | | | | | |
| *Frequency* | *Power Level* | *Av* | *Peak* | *Av* | *Peak* | *Av* | *Peak* | |
| 900 MHz | 5 | 220 | 1230 | 90 | 520 | 40 | 200 | mA |
| 1800 MHz | 0 | 170 | 960 | 70 | 350 | 30 | 140 | mA |

***Notes!*** Power Down Mode: DC power is applied but the modem is switched OFF.

Standby Mode: The GM29 is switched ON and camped on to the network. No call in progress.

Talk Mode: The GM29 is switched ON and a voice/data call is in progress.

The power consumption during transmission in Talk Mode is measured at maximum transmitted power.

The power consumption in Standby Mode is measured at the maximum paging rate.

## *Radio Specifications*

| | |
|---|---|
| Frequency range | GM29: EGSM 900 MHz and 1800 MHz (dual band) |
| Maximum RF output power | 2 W (900 MHz) and 1 W (1800 MHz) |
| Antenna impedance | 50 Ω |
| Static sensitivity | Better than –102 dBm |

## *Audio Specifications*

| *Parameter* | *Limit* |
|---|---|
| Output level (differential) | ≥4.0 $V_{pp}$ |
| Output level (dynamic load = 32 Ω) | ≥2.8 $V_{pp}$ |
| Distortion at 1 kHz and maximum output level | ≤5% |
| Offset, BEARP to BEARN | ±30 mV |
| Ear-piece mute-switch attenuation | ≥40 dB |

| *Ear piece model* | *Impedance* | *Tolerance* |
|---|---|---|
| Dynamic ear piece | [32 Ω + 800 µH] // 100 pF | ±20% |
| Dynamic ear piece | [150 Ω + 800 µH] // 100 pF | ±20% |
| Piezo ear piece | 1 kΩ + 60 nF | ±20% |

## *SIM Card Reader*

| | |
|---|---|
| Voltage type | Support for 3 V and 5 V SIM cards |

## *Electrical Connectors and LED*

| | |
|---|---|
| Plug-in power supply connector | RJ11 6-way |
| Handset audio connector | RJ9 4-way |
| Antenna connector | FME male |
| RS232 port | Sub-D socket, 9 pin |
| LED | Green |

### *Mechanical Specification*

| | |
|---|---|
| Length | 77.4 mm |
| Width | 66.4 mm |
| Height | 26.2 mm |
| Weight | <130 g |

### *Environmental specifications*

| | |
|---|---|
| Operating temperature range | –25 °C to +55 °C |
| Storage temperature range | –40 °C to +85 °C |
| Relative humidity | 5 - 95%, non-condensing |
| Stationary vibration, sinusoidal | Displacement: 7.5 mm<br>Acceleration amplitude: 20 m/s² and 40 m/s²<br>Frequency range: 2-8 Hz, 8-200 Hz, 200-500 Hz |
| Stationary vibration, random | Acceleration spectral density (m²/s²):<br>0.96, 2.88, 0.96<br>Frequency range:<br>5-10 Hz, 10-200 Hz, 200-500 Hz, 60 min/axis |
| Non-stationary vibration, including shock | Shock response spectrum I, peak acceleration:<br>3 shocks in each axis and direction;<br>300 m/s², 11 ms<br>Shock response spectrum II, peak acceleration:<br>3 shocks in each axis and direction;<br>1000 m/s², 6 ms |
| Bump | Acceleration: 250 m/s² |
| Free fall transportation | 1.2 m |
| Rolling pitching transportation | Angle: ±35 degrees; period: 8 s |
| Static load | 10 kPa |
| Low air pressure/high air pressure | 70 kPa/106 kPa |

### *Certification*

| | |
|---|---|
| Directive 1999/5/EC | EMC: EN 301 489-1 |
| | EMC: EN 301 489-7 |
| | Safety: EN 60950 |
| | GSM 3GPP TS 51.010-1 |
| Tested according to GCF-CC | |

# 7. Declaration of Conformity

## Declaration of Conformity

We, Sony Ericsson Mobile Communications AB of
Nya Vattentornet
S- 221 88 Lund, Sweden

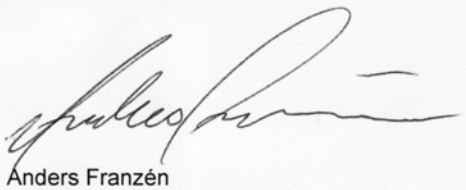
declare under our sole responsibility that our product

Sony Ericsson type 6100503- BV

and in combination with our accessories, to which this declaration relates is in conformity with the appropriate standards 3GPP TS 51.010-1, EN 301489-7 and EN 60950, following the provisions of, Radio Equipment and Telecommunication Terminal Equipment directive 99/5/EC with requirements covering EMC directive 89/336/EEC, and Low Voltage directive 73/23/EEC.

CE 0682

Basingstoke, November 2002
Place & date of issue



Anders Franzén
Corporate Vice President M2M Com

We fulfil the requirements of the R& TTE Directive (99/5/EC).

# *Part 3: Using AT Commands*

# 1. Introduction to AT Commands

## *1.1 Overview*

AT commands, issued from a computer in your application are used to control and implement the functions of the modem.

Using AT commands, the following actions are possible:

- Control of DCE
- GPRS
- Call control
- Supplementary Service
- SIM application tool kit

The GM29 contains a large number of Ericsson-specific commands in addition to those implemented in accordance with the GSM and ITU-T recommendations. These commands are provided to enhance the functions of the modem. The Ericsson-specific commands are identified by the asterisk that precedes the command (see the syntax description provided below).

## *1.2 Syntax Description*

This section provides a brief description of the syntax used for the GM29, AT command set. See the ITU-T recommendation V.25ter for additional information.

### 1.2.1 Conventions

In this manual, the following conventions are used to explain the AT commands.

| | |
|---|---|
| <command> | The name of the command that is to be entered. |
| <parameter> | The parameter values that are defined for a certain command. |
| <CR> | The command line is terminated by the Carriage Return (or Enter key) or ATS3 command. |
| <LF> | Line feed character or ATS4 command. |
| < > | The term enclosed in angle brackets is a syntactical element. The brackets do not appear in the command line. |

| | |
|---|---|
| [ ] | Square brackets are used to indicate that a certain item is optional. For example, sub-parameters of a command or an optional part of a response. The brackets do not appear in the command line. |
| **Value** | The default values of the supported parameters are indicated by using bold text when presenting the value. |

- Other characters, including '?', '=', parenthesis, etc., appear in commands and responses as written.
- The final result codes OK, ERROR, +CME ERROR: <err> and CMS ERROR:<err> (see sections 1.2.3, AT Response Syntax and 1.3, Error Codes) are not listed under "Possible Responses" for each AT command.
- OK and ERROR are listed if these are the only possible responses.

### 1.2.2 AT Command Syntax

The AT standard is a line-oriented command language. Each command is made up of the following three elements:

- the prefix;
- the body;
- the termination character.

The prefix consists of the letters "AT", which are derived from the first two letters of the word attention. The body is made up of the **command,** the **parameter,** and if applicable the associated **values**.

Commands may be combined in the same command line. Spaces between the individual bodies are ignored.

*Basic Syntax Command*

The format of basic syntax commands is as follows:

**AT<command>[=][<parameter>]<CR>**

***Example!*** ATL=0<CR> *(sets the volume of the speaker)*

Additional commands may follow a command on the same command line without any character being required for separation. For the command D parameters, see the description for the command in question.

A version of the basic syntax is:

**AT<command><parameter>**

*Extended Syntax Command*

- **AT+<command>= [<parameter>]**

- **AT*<command>=[<parameter>]**

***Example!*** AT+CFUN=0<CR> *(powers down the modem)*

If several values are included in the command, they are separated by commas. It is also possible to enter commands with no values.

Additional commands may follow an extended syntax command on the same command line if a semicolon (**;** IRA 3B) is inserted after the preceeding extended command as a separator.

*Read Command Syntax*

The read command is used to check the current values of parameters. Type '?', after the command line:

- **AT+<command>?**
- **AT*<command>?**
- **AT<command>?**

***Example!*** AT+CSCS?<CR> *(show current character set)*

<CR>"IRA"<CR>*(information text* response)

<CR>OK<CR>*(final result code response)*

*Test Command Syntax*

The test command is used to test whether the command has been implemented or to give information about the type of subparameters it contains. Type '?', after the command line:

- **AT+<command>=?**
- **AT*<command>=?**

***Example!*** AT+CPAS=?<CR> *(shows supported values for the response parameters)*

<CR>CPAS: (0, 3, 4, 129, 130, 131)<CR> *(supported values)*

<CR>OK<CR> *(final result code)*

If the indicated <parameter> is not recognized, the result code ERROR is issued.

***Note!*** Possible responses are indicated both as <command>:(list of supported <parameter>) and (in most cases) the actual range of the parameter values.

### 1.2.3 AT Response Syntax

The default mode response shown below, is in text mode. See the command V for further details.

Possible formats for the result codes are:

- Basic format result code, such as OK. The Basic result code also has a numerical equivalent.
- Extended format result code, prefixed with a plus sign (+) or an asterisk (*):
  - **AT+<command>: <parameter >**
  - **AT*<command>: <parameter>**

  where the <parameter> is the result code value, note that a single space character separates the colon character from the <parameter>. If several values are included in the result code, they are separated by commas. It is also possible that a result code has no value. The extended syntax result codes have no numerical equivalent. They are always issued in alphabetical form.
- Information text response may contain multiple lines separated by <CR>. The TE detects the end of informational text responses by looking for a final result code response, such as OK.

There are two types of result code responses as outlined below:

*Final Result Code*

A final result code indicates to the TE that execution of the command is completed and another command may be issued.

- If you type an implemented AT command, you should get the result code OK.
- If you type an AT command that is not implemented, or which had the wrong parameter or syntax, you will get an error result code. It is ERROR or, for example, +**<command>** ERROR followed by an error code.

Final result codes are:

| **Value** | **General meaning** |
|---|---|
| OK | Command executed, no errors |
| ERROR | Invalid command or command line too long |
| NO DIALTONE | No dialling possible, wrong mode |
| BUSY | Remote station busy |
| NO ANSWER | Connection completion time-out |
| NO CARRIER | Link not established or disconnected |

*Unsolicited Result Code*

Unsolicited result codes indicate the occurrence of an event not directly associated with a command being issued from the TE.

## *1.3 Error Codes*

### 1.3.1 +CME ERROR (Mobile Equipment Error Code)

This final result code is similar to the regular ERROR result code. If +CME ERROR: <err> is the result code for any of the commands in a command line, none of the commands in the same command line will be executed (neither ERROR nor OK result code shall be returned as a result of a completed command line execution). The format of <err> can be either numerical or alphabetical, and is set with the +CMEE command.

The table below provides the numerical values for the parameter <err>.

| *<err>* | *Description Syntax* |
|---|---|
| 0 | Phone failure |
| 1 | No connection to phone |
| 2 | Phone -adaptor link reserved |
| 3 | Operation not allowed |
| 4 | Operation not supported |
| 5 | PH-SIM PIN required |
| 10 | SIM not inserted |
| 11 | SIM PIN required |
| 12 | SIM PUK required |
| 13 | SIM failure |
| 14 | SIM busy |
| 15 | SIM wrong |
| 16 | Incorrect password |
| 17 | SIM PIN2 required |
| 18 | SIM PUK2 required |
| 20 | Memory full |
| 21 | Invalid index |
| 22 | Not found |
| 23 | Memory failure |
| 24 | Text string too long |
| 25 | Invalid characters in text string |
| 26 | Dial string too long |
| 27 | Invalid characters in dial string |
| 30 | No network service |

| *<err>* | *Description Syntax* |
|---|---|
| 31 | Network time-out |
| 32 | Network not allowed - emergency calls only |
| 100 | Unknown |
| 101- 255 | Reserved by ETS |

### 1.3.2 +CMS ERROR (Message Service Failure Result Code)

This final result code indicates an error related to mobile equipment or to the network. The operation is similar to the ERROR result code. None of the following commands in the same command line will be executed. Neither ERROR nor OK result code will be returned. ERROR is returned normally when an error is related to syntax or invalid parameters. Nevertheless, it always appears when a command fails.

The syntax is as follows:

+CMS ERROR: <err>

Values for the <err> parameter are described in the following table.

| *<err>* | *Description* |
|---|---|
| 0 - 127 | GSM 04.11 Annex E-2 values |
| 128 - 255 | GSM 03.40 subclause 9.2.3.22 values |
| 300 | ME failure |
| 301 | SMS service of ME reserved |
| 302 | Operation not allowed |
| 303 | Operation not supported |
| 304 | Invalid PDU mode parameter |
| 305 | Invalid text mode parameter |
| 310 | SIM not inserted |
| 311 | SIM PIN required |
| 312 | PH-SIM PIN required |
| 313 | SIM failure |
| 314 | SIM busy |
| 315 | SIM wrong |
| 316 | SIM PUK required |
| 317 | SIM PIN2 required |
| 318 | SIM PUK2 required |
| 320 | Memory failure |

| *<err>* | *Description* |
|---|---|
| 321 | Invalid memory index |
| 322 | Memory full |
| 330 | SMSC address unknown |
| 331 | No network service |
| 332 | Network time-out |
| 340 | No +CNMA acknowledgment expected |
| 500 | Unknown error |
| - 511 | Other values in range 256 - 511 are reserved |
| 512- | Manufacturer specific |

## *1.4 Examples on How to Use the AT Commands*

After every group of AT commands there is a section where some of the more complicated commands are exemplified. For a detailed description of the command in question (valid parameter values, AT command syntax and Response syntax) you are recommended to see its own descriptive section.

# 2. Call Control

## *2.1 AT+CPIN PIN Control*

See 3.23, AT+CPIN PIN Control

## *2.2 ATA Answer Incoming Call*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Answer an incoming call | ATA | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR<br>• OK |

Answer and initiate connection to an incoming call.

| *<text>* | *Description* |
|---|---|
| 19200 | Connected with data bit rate of 19200 bits/s (HSCSD) |
| 9600 | Connected with data bit rate of 9600 bits/s |
| 4800 | Connected with data bit rate of 4800 bits/s |
| 2400 | Connected with data bit rate of 2400 bits/s |

## 2.3 ATD Dial

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| • Originate a call and dial the phone number specified in the command as <dial_string> or<br>• Do a network detect | ATD<dial_string>[;] | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR<br>• NO DIAL TONE<br>• BUSY<br>• OK |
| Dial the phone number stored in the mobile phone which is located by the index <I> | ATD>ME<I>[;] | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR<br>• NO DIAL TONE<br>• BUSY<br>• OK |
| Dial the phone number stored in the SIM card which is located by the index <I> | ATD>SM<I>[;] | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR<br>• NO DIAL TONE<br>• BUSY<br>• OK |
| Dial the phone number stored in the *Last dialled number* list on the SIM card, which is located by the index <I><br>The most recently dialled number is assumed to have <I>="1" | ATD>LD<I>[;] | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR<br>• NO DIAL TONE<br>• BUSY<br>• OK |
| Redial the last phone number dialled.<br>**Ericsson specific** | ATDL[;] | ... |

Used to initiate a phone connection, which may be data or voice (phone number terminated by semicolon). The phone number used to establish the connection will consist of digits and modifiers, or a stored number specification.

If the dial string is followed by a semicolon this informs the phone that the number is a voice rather than a data number.

If the dial string is omitted, and the semicolon included, the command instructs the ME to do a network detect. If the network is available OK is returned.

Abortability:

Aborting an ATD command is accomplished by the transmission from the DTE to the DCE of any character. A single character shall be sufficient to abort the command in progress; however, characters transmitted during the first 125 milliseconds after transmission of the

termination character are ignored. This is to allow the DTE to append additional control characters such as line feed after the command line termination character.

| *<dial_string>* | *Description* |
|---|---|
| “0 1 2 3 4 5 6 7 8 9 * # +” | Valid characters for origination |
| W | The W modifier is ignored but is included only for compatibility purposes |
| , | The comma modifier is ignored but is included only for compatibility purposes |
| T | The T modifier is ignored but is included only for compatibility purposes |
| P | The P modifier is ignored but is included only for compatibility purposes |

| *<Final Result Code>* | *Description* |
|---|---|
| CONNECT | If connection is successfully established, only valid for data connections |
| CONNECT <text> | If connection is successfully established, only valid for data connections |
| NO CARRIER | Unable to establish a connection or the connection attempt was aborted by the user |
| ERROR | An unexpected error occurred while trying to establish the connection |
| NO DIALTONE | The mobile phone is being used for a voice call or is not within coverage of the network |
| BUSY | The phone number called is engaged, valid for data and voice connections |
| OK | Only valid for voice connections |

| *<text>* | *Description* |
|---|---|
| 19200 | Connected with data bit rate of 19200 bits/s (HSCSD) |
| 9600 | Connected with data bit rate of 9600 bits/s |
| 4800 | Connected with data bit rate of 4800 bits/s |
| 2400 | Connected with data bit rate of 2400 bits/s |

## *2.4 ATH Hang up*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Terminate the call | ATH | • ERROR<br>• OK |

Signals the MS to terminate an active call.

## 2.5 ATO Return to Online Data Mode

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Return to on-line data mode | ATO[<value>] | • CONNECT<br>• CONNECT <text><br>• NO CARRIER<br>• ERROR |

Switch to the on-line data mode from the on-line command mode during an active call. Returns ERROR when not in on-line command mode.

| *<value>* | *Description* |
|---|---|
| 0 | Return to on-line data state from on-line command |

## 2.6 ATP Select Pulse Dialling

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select pulse dialling | ATP | OK |
| Show if the command is supported? | ATP=? | OK |

Command is ignored, and is implemented for compatibility only. It would normally cause the next D command to use pulses when dialling the number.

## 2.7 ATT Select Tone Dialling

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select tone dialling | ATT | OK |
| Show if the command is supported? | ATT=? | OK |

Command is ignored, and is implemented for compatibility only. It would normally cause the next D command to use tones when dialling the number.

## 2.8 ATX Call Progress Monitoring Control

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set call progress monitoring control | ATX=[<n>] or ATX[<n>] | • OK<br>• ERROR |
| Read the current setting | ATX? | X: <n> |
| Show if the command is supported? | ATX=? | X: (list of supported <n>s) |

Defines if the dial-tone detection and busy-tone detection are to be used during a call set-up.

| *<n>* | *Description* |
|---|---|
| 0 | Body and dial tone detection off. No line speed reported on connection |
| 1 | Body and dial tone detection off. Report line speed on connection |
| 2 | Busy detection on and dial tone detection off. Report line speed on connection |
| 3 | Busy detect off and dial tone on. Report line speed on connection |
| 4 | Busy detect and dial tone detection on. Report line speed on connection. **Default value** |

***Note!*** If there is no network available the <n> parameter will decide if "NO DIALTONE" or "NO CARRIER" will be returned. If the call recipient is busy, the <n> parameter will decide if "BUSY" or "NO CARRIER" will be returned.

## 2.9 AT+CHUP Hang up Call

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request hang-up | AT+CHUP | • OK<br>• ERROR |
| Show if the commands is supported | AT+CHUP=? | • OK<br>• ERROR |

Causes the TA to hang-up the current call of the ME.

If no call is present, but an incoming call is notified, then the incoming call shall be rejected.

## *2.10 AT+CMOD Call Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request Call Mode | AT+CMOD=[<mode>] | • OK<br>• ERROR |
| Shows the current setting | AT+CMOD? | • +CMOD: <mode><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMOD=? | • +CMOD: (list of supported <mode>s)<br>• OK<br>• ERROR |

Selects the call mode of further dialing commands (D) or for next answering command (A). Mode can be either single or alternating. In this ETS, terms "alternating mode" and "alternating call" refer to all GSM bearer and teleservices that incorporate more than one basic service (voice, data, fax) within one call.

When single mode is selected the call originating and hang-up procedures are similar to procedures specified in ITU-T Recommendations V.25ter, T.31 and T.32. In GSM there can be voice followed by data (refer to GSM 02.02), alternating voice/data (refer to GSM 02.02) and alternating voice/fax calls (refer to GSM 02.03).

Test command returns values supported by the TA as a compound value.

***Note!*** +CMOD is set to zero after a successfully completed alternating mode call. It is set to zero also after a failed answering. The power-up, factory (&F) and user resets (Z), also set the value to zero. This reduces the possibility that alternating mode calls are originated or answered accidentally.

| *<mode>* | *Description* |
|---|---|
| 0 | Single mode. **Default value**.<br>In order to avoid accidental originating or answering of alternating calls is <mode> set to single mode in following cases:<br>- after a successfully completed alternating mode call;<br>- after a unsuccessful answering;<br>- after successfully execution of the commands &F and Z |

## 2.11 AT+CVHU Voice Hang-Up

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Command | +CVHU=[<mode>] | • +CME ERROR: <err><br>• OK |
| Read command | +CVHU? | • +CVHU: <mode><br>• +CME ERROR: <err> |
| Test if the command is supported | +CVHU=? | +CVHU: (list of supported <mode>s) |

Selects whether ATH or “drop DTR” causes a voice connection to be disconnected or not. Voice connection also includes alternating mode calls that are currently in voice mode.

***Note!*** When <mode>=2, this command must be viewed in conjunction with the V.25ter command &D, or &D will be ignored.

| *<mode>* | *Description* |
|---|---|
| 0 | “Drop DTR” ignored but OK response given. ATH disconnects |
| 1 | “Drop DTR” and ATH ignored but OK response given |
| 2 | “Drop DTR” behavior according to &D setting. ATH disconnects. **Default value** |

## 2.12 AT+VTS DTMF and Tone Generation

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request transmission of DTMF tone(s) | AT+VTS=<DTMF> | OK<br>ERROR |
| Show if the command is supported | AT+VTS=? | OK<br>ERROR |

This command allows the transmission of DTMF tones. These tones may be used, for example, when announcing the start of a recording period. The command is write only. In this profile of commands, the command does not operate in data or fax modes of operation (+FCLASS=0,1,2-7).

***Note!*** The ATD-command is used only for dialing. It is not possible to generate arbitrary DTMF tones using the ATD command.

***Note!*** The AT+VTS command is used only during a voice call.

| *<DTMF>* | *Description* |
|---|---|
| ASCII character string | An ASCII character string with entries in the set 0-9, #, *, A-D separated by commas. Each entry is interpreted as a single ASCII character.<br>Example: The string "8,9" sends two DTMF tones, "8" followed by "9" |

# 3. Control and Status

## *3.1 ATQ* *Result Code Suppression*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Result Code Suppression | ATQ[=]<value> | • OK<br>• ERROR |
| Read the current setting | ATQ? | Q: <value> |
| Show if the command is supported | ATQ=? | Q: (list of supported <value>s) |

Determines whether or not the DCE transmits result codes to the DTE. When result codes are being suppressed, no portion of any intermediate, final, or unsolicited result code - header, result text, line terminator, or trailer - is transmitted.

| *<value>* | *Description* |
|---|---|
| 0 | DCE transmits result codes. **Default value** |
| 1 | Result codes are suppressed and not transmitted |

## *3.2 ATS0* *Automatic Answer Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Automatic answer control | ATS0=[<rcnt>] | • OK<br>• ERROR |
| Read the current setting | ATS0? | <rcnt> |
| Show if the command is supported | ATS0=? | S0: (list of supported <rcnt>s) |

Defines the automatic answering feature of the modem. A non-zero value specifies the number of rings before the call is answered.

***Note!*** Call is always answered in the current fax class, regardless of whether the incoming call is voice, data, or fax.

| *<rcnt>* | *Description* |
|---|---|
| 0 | Disable automatic answer. **Default value** |
| 1-7 | Answer after the specified number of rings |

## 3.3 ATS2 *Escape Sequence Character*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set escape sequence character | ATS2=[<esc>] | • OK<br>• ERROR |
| Read the current setting | ATS2 | <esc> |
| Show if the command is supported | ATS2=? | S2: (list of supported <esc>s) |

Defines the character to be used as the escape sequence character when switching from on-line data mode to on-line command mode. The response to the command is modified to reflect the change.

| *<esc>* | *Description* |
|---|---|
| 43 | Escape sequence character. **Default value** |
| 0 to 255 | Escape sequence character |

***Note!*** If the <esc> parameter is set to a value in the range of 128-255, the escape sequence detection is disabled.

## 3.4 ATS3 *Command Line Termination Character*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Command Line Termination Character | ATS3=<value> | • OK<br>• ERROR |
| Read the current setting | ATS3? | <value> |
| Show if the command is supported | ATS3=? | S3: (list of supported <value>s) |

This S-parameter represents the decimal IA5 value of the character recognised by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S4 parameter.

The previous value of S3 is used to determine the command line termination character for entry of the command line containing the S3 setting command. However, the result code issued uses the value of S3 as set during the processing of the command line. For example, if S3 was previously set to 13 and the command line "ATS3=30" is issued,

the command line is terminated with a <CR> character (IA5 0/13), but the result code issued uses the character with the ordinal value 30 (IA5 2/14) in place of the <CR>.

| *<value>* | *Description* |
|---|---|
| 13 | Command line termination character, **Default value** |
| 0 to 127 | Command line termination character |

## *3.5 ATS4 Response Formatting Character*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Response Formatting Character | ATS4=<value> | • OK<br>• ERROR |
| Read the current setting | ATS4? | <value> |
| Show if the command is supported | ATS4=? | S4: (list of supported <value>s) |

This S-parameter represents the decimal IA5 value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter (see the description of the V parameter for usage).

If the value of S4 is changed in a command line, the result code issued in response to that command line will use the new value of S4.

| *<value>* | *Description* |
|---|---|
| 10 | Formatting character. **Default value**<br>Note: ASCII character 10 is equivalent to <LF> |
| 0 to 127 | Formatting character |

## 3.6 ATS5 *Command Line Editing Character (BACKSPACE)*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request Command Line Editing Character | ATS5=<value> | • OK<br>• ERROR |
| Shows the current setting | ATS5? | <value> |
| Show if the command is supported | ATS5=? | S5: (list of supported <value>s) |

This S-parameter represents the decimal IA5 value of the character recognised by the DCE as a request to delete from the command line the immediately preceding character.

| *<value>* | *Description* |
|---|---|
| 8 | Line editing character. **Default value** |
| 0 to 127 | Line editing character |

## 3.7 ATS6 *Blind Dial Delay Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Blind dial delay control | ATS6=[<dly>] | OK |
| Read the current setting | ATS6? | <dly> |
| Show if the command is supported | ATS6=? | S6: (list of supported <dly>s) |

Included for compatibility. No functionality

| *<dly>* | *Description* |
|---|---|
| 2 | Wait two seconds before blind dialling. **Default value** |
| 2-255 | Number of seconds to wait before blind dialling |

## 3.8 ATS7 Connection Completion Timeout

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set connection completion timeout | ATS7=[<tmo>] | • OK<br>• ERROR |
| Read the current setting | ATS7? | <tmo> |
| Show if the command is supported | ATS7=? | S7: (list of supported <tmo>s) |

Defines the maximum time allowed between completion of dialling and the connection being established. If this time is exceeded then the connection is aborted.

| *<tmo>* | *Description* |
|---|---|
| 50 | Timeout value in seconds. **Default value** |
| 1-255 | Timeout value in seconds |

## 3.9 ATS8 Comma Dial Modifier Delay Control

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Comma Dial Modifier Delay Control | ATS8=[<dly>] | • OK<br>• ERROR |
| Read the current setting. | ATS8? | <dly> |
| Show if the command is supported. | ATS8=? | S8: (list of supported <dly>s) |

Included for compatibility. No functionality

| *<dly>* | *Description* |
|---|---|
| 2 | The value of the dial modifier delay in seconds. **Default value** |
| 1-255 | The value of the dial modifier delay in seconds |

## 3.10 ATS10 *Automatic Disconnect Delay Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Automatic Disconnect Delay Control | ATS10=[<val>] | • OK<br>• ERROR |
| Read the current setting | ATS10? | <val> |
| Show if the command is supported | ATS10=? | S10: (list of supported <val>s) |

Included for compatibility. No functionality

| *<val>* | *Description* |
|---|---|
| 2 | Remains connected for two tenths of a second. **Default value** |
| 1-254 | Number of tenths of a second of delay |

## 3.11 AT*ECAM *Ericsson Call Monitoring*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Call Monitoring on or off | AT*ECAM=<onoff> | • OK<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current status for Call Monitoring | AT*ECAM? | • *ECAM: <onoff><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*ECAM=? | • *ECAM: list of supported <onoff>s<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command activates or deactivates the call monitoring function in the ME. When this log function is activated in the ME, the ME informs about call events, such as incoming call, connected, hang up etc.

It is preferable that the current status shall always be sent with result code *ECAV when activating the log function. The purpose of this is two fold:

- to gather relevant information for the call log in a TE;
- to make it possible for the TE to display call state information for an ongoing call.

| *<onoff>* | *Description* |
|---|---|
| 0 | The call log function is disabled (off). **Default value** |
| 1 | The call log function is enabled (on) |

*Examples*

AT*ECAM?
*ECAM: 0

AT*ECAM=1
OK

## *3.12 AT*EDST Ericsson Daylight Saving Time*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Daylight Saving Time | AT*EDST=<dst> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read current Daylight Saving Time | AT*EDST? | • *EDST: <dst><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT*EDST=? | • *EDST: (list of supported <dst>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command sets the daylight saving time hours.

***Note!*** This command affects the MS clock set with the AT+CCLK command. To avoid confusion it is recommended the daylight saving time (DST) is set with this command before setting the actual local time with AT+CCLK.

| *<dst>* | *Description* |
|---|---|
| 0 | Standard time |
| 1 | Daylight saving time, +1 hour |
| 2 | Daylight saving time, +2 hours |

## 3.13 AT*EMAR Ericsson Master Reset

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Perform a master reset in the MS | AT*EMAR=<phone lock code> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Shows if the command is supported or not | AT*EMAR=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

This command requests the MS to reset user data. The user data in the MS will be reset to the default values. This command also unlocks the MS.

| *<phone lock code>* | *Description* |
|---|---|
| String | Security code (phone lock code) must be verified before performing the master reset, see also AT+CLCK |

## 3.14 AT*EPEE Ericsson Pin Event

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Requests the MS to inform when the PIN code has been inserted | AT*EPEE=<onoff> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*EPEE=? | • *EPEE: (list of supported <onoff>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current status for PIN Code Request | AT*EPEE? | • *EPEE: <onoff><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

The command requests the MS to report when the PIN code has been inserted and accepted.

| *<onoff>* | *Description* |
|---|---|
| 0 | Request for report on inserted PIN code is not activated (off). **Default value** |
| 1 | Request for report on inserted PIN code is activated (on) |

## 3.15 AT+CCLK Set Clock and Date

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set the real time clock of the ME | AT+CCLK=<time> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show the current setting | AT+CCLK? | • +CCLK: <time><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CCLK=? | • OK<br>• ERROR |

Sets the real time clock of the ME. If setting fails in an ME, error +CME ERROR: <err> is returned. Read command returns the current setting of the clock.

| *<time>* | *Description* |
|---|---|
| string type value | Format is “yy/mm/dd,hh:mm:ss±zz”, where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -47...+48), e.g. 6th of May 1994, 22:10:00 GMT+2 hours reads “94/05/06,22:10:00+08”<br><br>NOTE: If the ME does not support time zone information then the three last characters of <time> are not returned by +CCLK? |

## 3.16 AT+CEER Extended Error Report

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request an Extended Error Report | AT+CEER | • +CEER: <report><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CEER=? | • OK<br>• ERROR |

Causes the TA to return one or more lines of information text <report>. Typically, the text will consist of a single line containing the failure information given by the GSM network in text format.

| *<report>* | *Description* |
|---|---|
| characters | The total number of characters, including line terminators, in the information text shall not exceed 2041 characters.<br>Text shall not contain the sequence 0<CR> or OK<CR> |

## *3.17 AT+CFUN Set Phone Functionality*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set MS functionality | AT+CFUN=<fun> | • +CME ERROR: <err><br>• OK |
| Show the current setting | AT+CFUN? | • +CFUN: <fun><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CFUN=? | • +CFUN: (list of supported <fun>s)<br>• +CME ERROR: <err> |

Selects the level of functionality <fun> in the MS.

"Full functionality" results in the highest level of power usage. It is possible to activate all parts of the modem. Default ON state.

"Minimum functionality" results in minimum power usage. The modem is in a powered OFF state. No functionality can be executed until the modem is powered back ON.

Transitions between states are defined below.

| *Initial State* | *New State* | *Function* |
|---|---|---|
| <fun> = 0 | - | Modem is off. No functionality |
| <fun> = 1 | <fun> = 0 | Modem was fully active. Active calls are hung up and an IMSI detach is sent. The modem then powers off |

| *<fun>* | *Description* |
|---|---|
| 0 | Minimum functionality. Modem is OFF |
| 1 | Full functionality. Modem is ON |

## *3.18 AT+CIND Indicator Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Indicator Control | AT+CIND=[<ind> [,<ind>[,…]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT+CIND? | • +CIND: <ind>,<ind>,…<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CIND=? | • +CIND: (<descr>,(list of supported <ind>s)), (<descr>,(list of supported <ind>s)),…<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Used to set the values of ME indicators. <ind> value 0 means that the indicator is off (or in state which can be identified as “off” state), 1 means that indicator is on (or in a state which is more substantial than “off” state), 2 is more substantial than 1, and so on. If the indicator is a simple on/off style element, it has values 0 and 1. The number of elements is ME specific. If the ME does not allow setting of indicators or it is not currently reachable, +CME ERROR: <err> is returned. If a certain indicator is not writable, it cannot be set. If the parameter is an empty field, the indicator will keep the previous value.

Test command returns pairs, where string value <descr> is a maximum 16 character description of the indicator and compound value is the allowed values for the indicator. If ME is not currently reachable, +CME ERROR: <err> is returned (refer to GSM 07.07).

| *<ind>* | *Description* |
|---|---|
| Integer type | Value shall be in range of corresponding <descr> |

| *<descr>* | *Description* |
|---|---|
| “signal” | Signal quality (0-5) |
| “service” | Service availability (0-1) |
| “sounder” | Sounder activity (0-1) |
| “message” | Message received (0-1) |
| “call” | Call in progress (0-1) |
| “roam” | Roaming indicator (0-1) |
| “sms full” | A short message memory storage in the MT has become full (1), or memory locations are available (0); i.e. the range is (0-1) |

## *3.19 AT+CLAC List all available AT Commands*

| *Command* | *Possible Responses* |
|---|---|
| +CLAC | <AT Command1> [<CR> <LF> <AT Command2>[…]]<br>+CME ERROR: <err> |
| +CLAC=? | +CME ERROR: <err> |

Causes the ME to return one or more lines of AT commands. This command has the same functionality as AT*.

***Note!*** This command only returns the AT commands that are available to the user.

## *3.20 AT+CMEE Mobile Equipment Error*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request GSM Mobile Equipment Error Control | AT+CMEE=[<n>] | • OK<br>• ERROR |
| Read the command | AT+CMEE? | • +CMEE: <n><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMEE=? | • +CMEE: (list of supported <n>s)<br>• OK<br>• ERROR |

Disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the ME. When enabled, ME related errors cause +CME ERROR: <err> final result code instead of the regular ERROR final result code. ERROR is returned normally when error is related to syntax, invalid parameters, or TA functionality. For more information, refer to "+CME ERROR (Mobile Equipment Error Code)", page 57.

| *<n>* | *Description* |
|---|---|
| 0 | Disable +CME ERROR: <err> result code and use ERROR instead.<br>**Default value** |
| 1 | Enable +CME ERROR: <err> result code and use numeric <err> values (see page 57) |
| 2 | Enable +CME ERROR: <err> result code and use verbose <err> values (see page 57) |

## 3.21 AT+CMER *Mobile Equipment Event Reporting*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set phone activity status | AT+CMER=[<mode> [,<ind>[,<bfr>]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT+CMER? | • +CMER: <mode>,<ind>,<bfr><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CMER=? | • +CMER: (list of supported <mode>s), (list of supported <ind>s), (list of supported <bfr>s)<br>• OK<br>• ERROR |

Enables or disables the sending of unsolicited result codes from ME to TE in the case of key pressings, display changes, and indicator state changes. <mode> controls the processing of unsolicited result codes specified within this command. <bfr> controls the effect on buffered codes when <mode> 1, 2 or 3 is entered. If the ME does not support setting, +CME ERROR: <err> is returned.

| *<mode>* | *Description* |
|---|---|
| 0 | Buffer unsolicited result codes in the TA; if TA result code buffer is full, codes can be buffered in some other place or the oldest ones can be discarded |
| 3 | Forward unsolicited result codes directly to the TE; TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode |

| *<ind>* | *Description* |
|---|---|
| 0 | No indicator event reporting |
| 1 | Indicator event reporting using result code +CIEV: <ind>,<value>. <ind> indicates the indicator order number (as specified for +CIND) and <value> is the new value of indicator. Only those indicator events, which are not caused by +CIND shall be indicated by the TA to the TE |

| *<bfr>* | *Description* |
|---|---|
| 0 | TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered |

## *3.22 AT+CPAS Phone Activity Status*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute Phone Activity Status | AT+CPAS[=<mode>] | • +CPAS: <pas><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CPAS=? | • +CPAS: (list of supported <pas>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Returns the activity status <pas> of the ME. It can be used to interrogate the ME before requesting action from the phone.

When the command is executed without the <mode> argument, the command returns <pas>-values from 0 to 128 (for supported values se table 1 below). When, on the other hand, the command is executed with the <mode> argument set to 1, the command may return Ericsson specific <pas> values from 129 to 255 (for supported values see the table below).

Test command returns values supported by the ME as a compound value: refer to GSM 07.07.

| *<pas>* | *Description* |
|---|---|
| 0 | Ready (ME allows commands from TA/TE) |
| 3 | Ringing (ME is ready for commands from TA/TE, but the ringer is active) |
| 4 | Call in progress (ME is ready for commands from TA/TE, but a call is in progress) |
| 129 | In idle state, (operator name/clock/date). This state is a sub-state to 'ready' (0) and has the following definition:<br>In Idle state, that is, operator, clock and date (is set) shown on the display<br>No conversation or data call in progress<br>No sub-menus shown on the display<br>4 Only digits, clear, *, NO and # allowed in this mode, not changing mode |
| 130 | Mobile oriented call in progress. This is a sub-state to 'call in progress' |
| 131 | Mobile terminated call in progress. This is a sub-state to 'call in progress' |

| *<mode>* | *Description* |
|---|---|
| 1 | Allows the CPAS to return Ericsson specific <pas> values, such as 129, 130 and 131 |

## *3.23 AT+CPIN PIN Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request PIN Control | AT+CPIN=<pin>[,<newpin>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show the current setting | AT+CPIN? | • +CPIN: <code><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CPIN=? | • +CME ERROR: <err><br>• +CPIN: (supported <code>s)<br>• OK<br>• ERROR |

Sends the password to the ME, which is necessary to make the ME operational (SIM PIN, SIM PUK or PH-SIM). If the PIN is to be entered twice, the TA autonomously repeats the PIN. If no PIN request is pending, no action is taken towards the ME and an error message (+CME ERROR <err>) is returned to the TE.

If the PIN required is PUK, the second pin is required. This second PIN, <newpin>, is used to replace the old PIN in the SIM.

***Note!*** Commands which interact with the ME that are accepted when the ME has a pending request for SIM PIN, SIM PUK or PH-SIM are: +CGMI, +CGMM, +CGMR, +CGSN, +CFUN, +CMEE +CPIN, L and M.

| *<pin>,<newpin>* | *Description* |
|---|---|
| string | The range for the SIM PIN and the PH- SIM PIN is 4 - 8 digits. The SIM PUK consists of 8 digits |

| *<code>* | *Description* |
|---|---|
| READY | ME is not pending for any password |
| SIM PIN | ME is waiting SIM PIN to be given |
| SIM PUK | ME is waiting SIM PUK to be given |

| *<code>* | *Description* |
|---|---|
| PH-SIM PIN | ME is waiting PHone-to-SIM card password to be given |
| SIM PIN2 | ME is waiting SIM PIN2 to be given. This <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered correctly after the failure, it is recommended that ME does not block its operation |
| SIM PUK2 | ME is waiting SIM PUK2 to be given. This <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR:18); if PUK2 and new PIN2 are not entered correctly after the failure, it is recommended that ME does not block its operation. |
| BLOCKED | The SIM cards is blocked for the user |

| *<err>* | *Description* |
|---|---|
| 0 | Phone failure |
| 5 | PH-SIM PIN required |
| 10 | SIM not inserted |
| 11 | SIM PIN required |
| 12 | SIM PUK required |
| 13 | SIM failure |
| 14 | SIM busy |
| 15 | SIM wrong |
| 16 | Incorrect password |
| 24 | Text string too long |
| 25 | Invalid characters in text string |
| 100 | Unknown |

## *3.24 AT+CPWD Change Password*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request facility lock | AT+CPWD=<fac>, <oldpwd>, <newpwd> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CPWD=? | • +CPWD: (<fac1>,<pwdlength1>), (<fac2>,<pwdlength2>),…<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Sets a new password for the facility lock function defined by command Facility Lock +CLCK.

Test command returns a list of pairs which present the available facilities and the maximum length of their password.

| *<fac>* | *Description* |
|---|---|
| “PS” | PH-SIM (lock PHone to SIM card) (ME asks password when other than current SIM card inserted) |
| “SC” | SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued) |
| “P2” | SIM PIN2 |
| “AO” | BAOC (Barr All Outgoing Calls) (refer GSM 02.88 clause 1) |
| “OI” | BOIC (Barr Outgoing International Calls) (refer GSM 02.88 clause 1) |
| “AI” | BAIC (Barr All Incoming Calls) (refer GSM 02.88 clause 2) |
| “IR” | BIC-Roam (Bar Incoming Calls when Roaming outside the home country) (refer GSM 02.88 clause 2) |
| “OX” | BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer GSM 02.88 clause 1) |
| “AB” | All Barring services (refer GSM 02.30) |
| “AG” | All outGoing barring services (refer GSM 02.30) |
| “AC” | All inComing barring services (refer GSM 02.30) |

| *<oldpwd>* | *Description* |
|---|---|
| string type | <oldpwd> shall be the same as password specified for the facility from the ME user interface or with the change password command, +CPWD |

| *<newpwd>* | *Description* |
|---|---|
| string type | <newpwd> is the new password, maximum length of password can be determined with <pwdlength> |

| *<pwdlength>* | *Description* |
|---|---|
| Integer type | Maximum length of the password for the facility |

| *<err>* | *Description* |
|---|---|
| 0 | Phone failure |
| 3 | Operation not allowed |
| 5 | PH-SIM PIN required |
| 10 | SIM not inserted |
| 11 | SIM PIN required |
| 12 | SIM PUK required |
| 13 | SIM failure |

| *<err>* | *Description* |
|---|---|
| 14 | SIM busy |
| 15 | SIM wrong |
| 16 | Incorrect password |
| 17 | SIM PIN2 required |
| 18 | SIM PUK2 required |
| 23 | Text string too long |
| 24 | Invalid characters in text string |
| 100 | Unknown |
| 101..255 | Reserved by ETS |

## *3.25 AT+CR Service Reporting Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Service Reporting Control | AT+CR=<mode> | • OK<br>• ERROR |
| Read current setting | AT+CR? | • +CR: <mode><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CR=? | • +CR: (list of supported <mode>s)<br>• OK<br>• ERROR |

Enables or disables display of intermediate bearer capability reports during the handshake phase.

| *<mode>* | *Description* |
|---|---|
| 0 | Disable reporting. **Default value** |
| 1 | Enable reporting |

Intermediate Result Codes:

+CR: <serv>

## 3.26 AT+CRC Cellular Result Code

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Cellular Result Code option | AT+CRC=[<mode>] | • OK<br>• ERROR |
| Show the current setting | AT+CRC? | • +CRC: <mode><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CRC=? | • +CRC: (list of supported <mode>s)<br>• OK<br>• ERROR |

Command controls whether or not;

- the extended format of incoming call indication;
- or GPRS network request for PDP context activation;
- or notification for VBS/VGCS calls is used.

When enabled, an incoming call is indicated to the TE with unsolicited result code +CRING: <type> instead of the normal RING.

Test command returns values supported by the TA as a compound value.

| *<mode>* | *Description* |
|---|---|
| 0 | Disables extended format |
| 1 | Enables extended format |

Unsolicited Result Codes:

+CRING: <type>

## 3.27 AT+CSAS Save Settings

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Save Settings | AT+CSAS[=<profile>] | • *+CMS ERROR: <err>*<br>• *OK*<br>• *ERROR* |
| Get available profiles | AT+CSAS=? | • +CSAS: (list of supported <profile>s)<br>• *+CMS ERROR: <err>*<br>• OK<br>• ERROR |

Saves active message service settings to a non-volatile memory. A TA can contain several settings profiles. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and

Select Cell Broadcast Message Types +CSCB (if implemented) are saved. Certain settings may not be supported by the storage (e.g. SIM SMS parameters) and therefore can not be saved.

Test command shall display the supported profile numbers for reading and writing of settings.

| *<profile>* | *Description* |
|---|---|
| 0..255 | Manufacturer specific profile number where settings are to be stored. **Default value is 0** |

## *3.28 AT+CSQ Signal Strength*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute Signal Strength | AT+CSQ | • +CSQ: <rssi>,<ber><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CSQ=? | • +CSQ: (list of supported <rssi>s),(list of supported <ber>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Returns the received signal strength indication <rssi> and channel bit error rate <ber> from the ME. Test command returns values supported by the TA as compound values.

| *<rssi>* | *Description* |
|---|---|
| 0 | –113dBm or less |
| 1 | –111dBm |
| 2..30 | –109… –53dBm |
| 31 | –51dBm or greater |
| 99 | Not known or not detectable |

| *<ber>* | *Description* |
|---|---|
| 0..7 | As RXQUAL values in the table in GSM 05.08 subclause 8.2.4 |
| 99 | Not known or not detectable |

## *3.29 AT+CTZU Automatic Time Zone Update*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Enable and disable automatic time zone update via NITZ | AT+CTZU=<onoff> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read current setting | AT+CTZU? | • +CTZU: <onoff><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CTZU=? | • +CTZU: (list of supported <onoff>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Enables and disables the automatic time zone update via NITZ. If setting fails in an ME error, +CME ERROR <err> is returned.

| *<onoff>* | *Description* |
|---|---|
| 0 | The automatic time zone update is disabled (off). **Default value** |
| 1 | The automatic time zone update is enabled (on) |

# 4. Audio

AT*E2EAMS and AT*E2APR are new commands that replace the funtionality offered by the *EALR, *EAMS, *EARS and *ELAM commands. Use the new commands in new applications. The old commands are included for compatibility.

## *4.1 AT*E2EAMS Ericsson M2M Audio Profile Modification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request operation with audio profile | AT*E2EAMS= <op>[,<TxPGA>, <RxPGA>,<SideToneGain>, <AuxInGain>,<MicInGain>, <TxAGC>,<Volume>, <MaxVolume>,<MicPath>, <SpkPath>,<TxPCM>, <RxPCM>,<HFAlgorithm>, <LocalAudio>,<TxGainLow>,<MicVolt2V>,<SideTone>, <NoiseRed>,<EchoCancel>,<AnalogRing>,][,<val>]] | • ERROR<br>• OK |
| Display set profile | AT*E2EAMS? | • *E2EAMS: <TxPGA>, <RxPGA>, <SideToneGain>, <AuxInGain>, <MicInGain>, <TxAGC>,<Volume>, <MaxVolume>, <MicPath>,<SpkPath>, <TxPCM>,<RxPCM>, <HFAlgorithm>, <LocalAudio>, <TxGainLow>, <MicVolt2V>, <SideTone>,<NoiseRed>, <EchoCancel>, <AnalogRing><br>OK<br>• ERROR |
| Show if the command is supported | AT*E2EAMS=? | • *E2EAMS: (list of supported <op>s)<br>• ERROR |

This command allows the modification and configuration of the current audio profile. An audio profile is a set of data which uniquely defines the way in which the audio paths, gains, DSP algorithms and switch setting are configured. There are several audio profiles available in non-volatile storage, and the current profile can be modified by use of the AT*E2APR command.

The AT*E2EAMS command allows the user to:

- configure the whole profile, specifying each audio parameter in a comma separated list;
- set a single parameter, given by its parameter number;
- save the current profile to non-volatile memory under the current profile number (see AT*E2APR).

The current audio settings can also be displayed by running the read command AT*E2EAMS?

Default audio settings are given in AT*E2APR.

Abortability:

This command may not be aborted.

Refer to the diagram below to understand which parts of the audio circuit are affected by the various parameters.

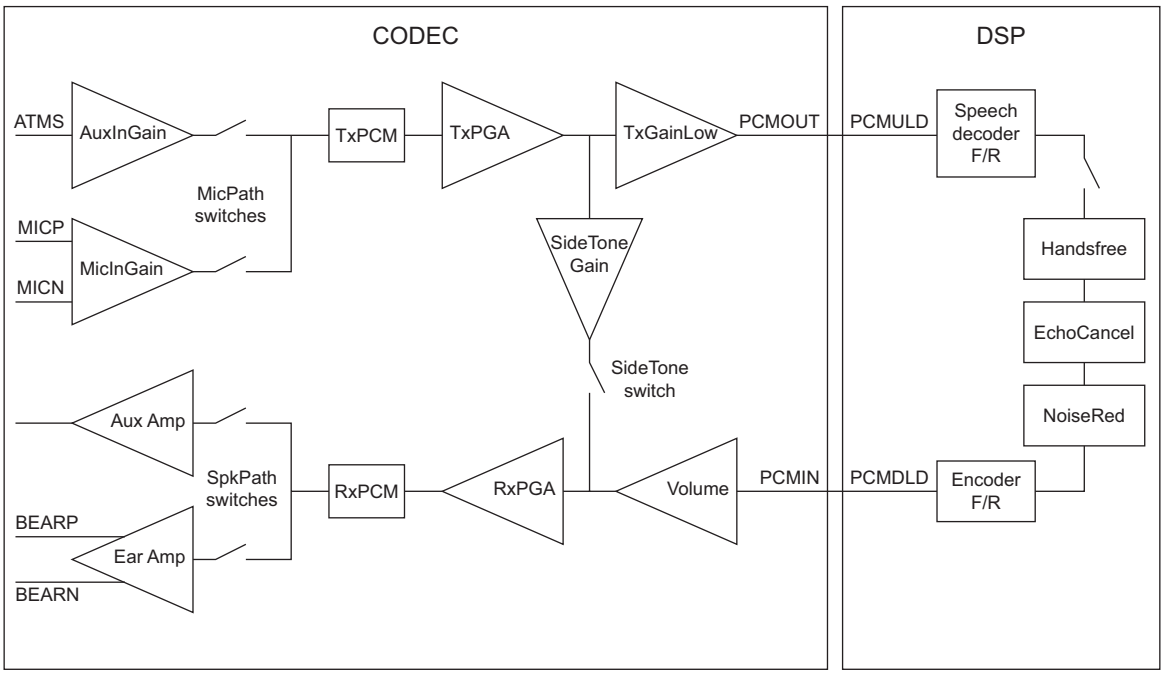



*Figure 4.1 Audio diagram of the CODEC*

| *<op>* | *Description* |
|---|---|
| 0 | Configure current profile (<pr1> to <pr21>) |
| 1 | Set <TxPGA> |
| 2 | Set <RxPGA> |
| 3 | Set <SideToneGain> |
| 4 | Set <AuxInGain> |
| 5 | Set <MicInGain> |
| 6 | Set <TxAGC> |
| 7 | Set <Volume> |
| 8 | Set <MaxVolume> |
| 9 | Set <MicPath> |
| 10 | Set <SpkPath> |
| 11 | Set <TxPCM> |
| 12 | Set <RxPCM> |
| 13 | Set <HFAlgorithm> |
| 14 | Set <LocalAudio> |
| 15 | Set <TxGainLow> |
| 16 | Set <MicVolt2V> |
| 17 | Set <SideTone> |
| 18 | Set <NoiseRed> |
| 19 | Set <EchoCancel> |
| 20 | Set <AnalogRing> |
| 255 | Save current profile to non-volatile storage at current profile number |

| *<TxPGA>, <RxPGA>* | *Description* |
|---|---|
| 0 | -5 dB PGA gain |
| 1 | -2.5 dB PGA gain |
| 2 | 0 dB PGA gain |
| 3 | 2.5 dB PGA gain |

| *<TxPGA>, <RxPGA>* | *Description* |
|---|---|
| 4 | 5 dB PGA gain |
| 5 | 7.5 dB PGA gain |
| 6 | –7.5 dB PGA gain |
| 7 | –10 dB PGA gain |

| *<SideToneGain>* | *Description* |
|---|---|
| 0 | 10 dB |
| 1 | 13 dB |
| 2 | 16 dB |
| 3 | 19 dB |
| 4 | 22 dB |
| 5 | 25 dB |

| *<AuxInputGain>* | *Description* |
|---|---|
| 0 | MUTE |
| 1 | 13 dB |
| 2 | 34 dB |
| 3 | 46 dB |

| *<MicInputGain>* | *Description* |
|---|---|
| 0 | MUTE |
| 1 | 13 dB |
| 2 | 25 dB |
| 3 | 34 dB |
| 4 | 46 dB |

| *<TxAGCGain>* | *Description* |
|---|---|
| 0 | 0 dB |
| 1 | 3 dB |
| 2 | 6 dB |

| <*Volume*>, <*MaxVolume*> | *Description* |
|---|---|
| 0 | MUTE |
| 1-9 | Volume levels 1-9 |

| <*MicPath*>, <*SpkPath*> | *Description* |
|---|---|
| 0 | OFF |
| 1 | MUTE |
| 2 | Internal (using microphone/speaker) |
| 3 | External (using ATMS/AFMS) |

| <*TxPCM*>, <*RxPCM*> | *Description* |
|---|---|
| 0 | 13 bit PCM |
| 1 | 16 bit PCM |

| <*HFAlgorithm*> | *Description* |
|---|---|
| 0 | No handsfree |
| 1 | Advanced handsfree |
| 2 | Switching handsfree |
| 3 | No handsfree handheld |
| 4 | No handsfree external |

| <*LocalAudio*> | *Description* |
|---|---|
| 0 | Local audio mode off |
| 1 | Local audio microphone/no speaker |
| 2 | Local audio no microphone/speaker |
| 3 | Local audio microphone/speaker |

| <*TxGainLow*> | *Description* |
|---|---|
| 0 | Tx gain normal |
| 1 | Tx gain –7 dB |

| *<MicVolt2V>* | *Description* |
|---|---|
| 0 | Microphone voltage at 2.5 V |
| 1 | Microphone voltage at 2 V |

| *<SideTone>, <NoiseRed>, <EchoCancel>, <AnalogRing>* | *Description* |
|---|---|
| 0 | OFF |
| 1 | ON |

*Examples*

AT*E2EAMS=?
*E2EAMS=(0-21,255)
OK

Current default profile is 0:

AT*E2EAMS?
*E2EAMS: 2,2,3,2,3,2,5,9,3,3,0,1,0,0,0,1,1,1,1,1,1
OK

Sets current profile with these settings:

AT*E2EAMS=0,2,1,2,0,0,2,5,9,2,2,0,1,0,0,0,1,1,0,0,1,1
OK

Sets TxPGA gain to 0dB:

AT*E2EAMS=1,2
OK

Turns analog ringing off:

AT*E2EAMS=20,0
OK

Save current profile to currently loaded profile in non-volatile memory:

AT*E2EAMS=255
OK

## 4.2 AT*E2APR M2M Audio Profile Manipulation

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request operation with audio profile | AT*E2APR= <op>[,<prnum1> [,<prnum2>]] | • ERROR<br>• OK<br>• *E2APR: <TxPGA>,<RxPGA>, <SideToneGain>,<AuxInGain>,<MicInGain>,<TxAGC>, <Volume>,<MaxVolume>, <MicPath>,<SpkPath>, <TxPCM>,<RxPCM>, <HFAlgorithm>,<LocalAudio>, <TxGainLow>,<MicVolt2V>, <SideTone>,<NoiseRed>, <EchoCancel>,<AnalogRing><br>• OK |
| Display currently set profile | AT*E2APR? | • *E2APR: current <prnum><br>• ERROR |
| Shows if the command is supported | AT*E2APR=? | • *E2APR: (list of supported <op>s), (list of supported <prnum1>s), (list of supported <prnum2>s)<br>• ERROR |

This command allows the maniuplation and storage of the audio “profiles” stored in the MS. The requirement for the 2nd and 3rd parameters depend on the operation being carried out.

Using the command you can:

- Set one of the three audio profiles 0, 1 or 2 as the current profile. This will load the profile's settings from NVM and implement them.
- Read one of the audio profiles. The current settings for the profile number defined will be displayed.
- Copy all parameters from one profile into another.
- Reset any of the profiles. This will reinstate the factory defaults for the profile:
  - 0 is the handset profile,
  - 1 is the portable handsfree profile,
  - 2 is the car kit profile.
- Set a profile as the default profile on next power up.

| *<op>* | *Description* |
|---|---|
| 0 | Set profile <prnum1> to set as current |
| 1 | Copy profile <prnum1> to <prnum2> |
| 2 | Read profile <prnum1> settings |
| 3 | Reset profile <prnum1> to factory default |
| 4 | Set default profile as <prnum1>. Will store this as defautl profile in NVM, and use it as default from next power on |

| *<prnum1>, <prnum2>* | *Description* |
|---|---|
| 0 | Profile 0 (Factory profile set for handset). **Default value** |
| 1 | Profile 1 (Factory profile set for portable handsfree) |
| 2 | Profile 2 (Factory profile set for car kit) |

*Examples*

AT*E2APR=?
*E2APR= (0-4),(0-2),(0-2)
OK

Current default profile is profile 0:

AT*E2APR?
*E2APR: 0
OK

Set audio profile now used to profile 1:

AT*E2APR=0,1
OK

Audio profile 1 settings:

AT*E2APR=1,1
*E2APR: 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
OK

Copy audio profile 1 to audio profile 2:

AT*E2APR=2,1,2
OK

Reset audio profile 1 with factory default - this also resets the current audio paths to the new profile as 1 is currently used:

AT*E2APR=3,1
OK

Sets profile number 1 as the default when modem is powered on:

AT*E2APR=4,1
OK

## 4.3 AT*EALR Ericsson Audio Line Request

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request the audio lines (ATMS,AFMS) | AT*EALR=<mode> [,<activation> [,<aud_status>]] | • *EALR: <mode>, <activation>,<resp><br>• OK<br>• ERROR |
| Show the current setting | AT*EALR? | *EALR: <mode>,<activation>,<resp> |
| Show list of supported parameters | AT*EALR=? | *EALR:(list of supported <mode>s, <activation>s and <aud_status>s parameters) |

Included for compatibility. No functionality.

| *<mode>* | *Description* |
|---|---|
| 0 | No request for ATMS or AFMS |
| 1 | Request ATMS and not AFMS |
| 2 | Request AFMS and not ATMS |
| 3 | Request ATMS and AFMS |

| *<activation>* | *Description* |
|---|---|
| 0 | Not direct activated audio accessory (e.g. cordless portable hands free) |
| 1 | Direct activated audio accessory (e.g. vehicle hands free) |

| *<aud_status>* | *Description* |
|---|---|
| 0 | No change of the audio status |
| 1 | Audio hand over. Accessory hands over control of both the audio lines and the call to the phone |
| 2 | Audio demand. Accessory demands control of both the audio lines and the call |

| *<resp>* | *Description* |
|---|---|
| 0 | Disable ATMS and AFMS |
| 1 | Enable ATMS and disable AFMS |
| 2 | Disable ATMS and enable AFMS |
| 3 | Enable ATMS and AFMS |

## *4.4 AT*EAMS Ericsson Audio Mode Selection*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets the audio mode for the application | AT*EAMS=<internal_voice_alg>[,<noise_reduction>[,<side tone>[,<short_echo_canceling>[,<ATMS_gain>[,<class>[,<ATMS_sensitivity_deviation_from_class>[,<AFMS_sensitivity_deviation_from_class>]]]]]]] | • OK<br>• ERROR |
| Show the current audio mode setting | AT*EAMS? | *EAMS:<internal_voice_alg >,<noise_reduction>,<side_tone>,<short_echo_canceling>,<AFMS_gain>,<class>,<ATMS_sensitivity_deviation_from_class>,<AFMS_sensitivity_deviation_from_class> |
| Show list of supported services | AT*EAMS=? | *EAMS: (list of supported <internal_voice_alg >s,<noise_reduction>s,<side_tone>s,<short_echo_canceling>s,<AFMS_gain>s>,<class>s,<ATMS_sensitivity_deviation_from_class>s,<AFMS_sensitivity_deviation_from_class>s) |

Included for compatibility. No functionality.

| *<internal_voice_alg>* | *Description* |
|---|---|
| 0 | None |
| 1 | Semi Duplex |
| 2 | Full Duplex<br>(Note! the internal hands free algorithm in the MS contains echo cancelling) |

| *<noise_reduction>* | *Description* |
|---|---|
| 0 | Off |
| 1 | On |

| *<side_tone>* | *Description* |
|---|---|
| 0 | Off |
| 1 | On |

| <*short_echo_canceling*> | *Description* |
|---|---|
| 0 | Off |
| 1 | On |

| <*ATMS_gain*> | *Description* |
|---|---|
| 0 | Normal (0 dB) (internal voice processing) |

| <*Class*> | *Description* |
|---|---|
| 0 | None |
| 1 | Low end, class reference Hector |
| 2 | Mid End, class reference Scott |
| 3 | High End, class reference Hasse |

| <*ATMS_sensitivity_deviation_from_class*>,<*AFMS_sensitivity_deviation_from_class*> | *Description* |
|---|---|
| 0 | 0 dB |
| 1 | 2,5 dB |
| 2 | –2,5 dB |
| 3 | 5,0 dB |
| 4 | –5,0 dB |

## *4.5 AT*EARS Ericsson Audio Ring Signal*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request analogue ring signal in the loudspeaker | AT*EARS=<mode> | • OK<br>• ERROR |
| Show the current mode setting | AT*EARS? | *EARS: <mode> |
| Show list of supported modes | AT*EARS=? | *EARS: (list of supported <mode>s) |

Included for compatibility. No functionality.

| <*mode*> | *Description* |
|---|---|
| 0 | Disable analogue ring signal |
| 1 | Enable analogue ring signal |

## 4.6 AT*ELAM Ericsson Local Audio Mode

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set local audio mode | AT*ELAM=<mic> [,<loudspeaker>] | • *ELAM: <mic>, <loudspeaker><br>• OK<br>• ERROR |
| Show the current service setting | AT*ELAM? | *ELAM: <mic>,<loudspeaker> |
| Show list of supported parameters | AT*ELAM=? | *ELAM: (list of supported <mic>s and <loudspeaker>s parameters) |

Included for compatibility. No functionality.

| *<mic>* | *Description* |
|---|---|
| 0 | Off |
| 1 | Microphone analogue |

| *<loudspeaker>* | *Description* |
|---|---|
| 0 | Off |
| 1 | Loudspeaker analogue |

## 4.7 AT*EMIC Ericsson Microphone Mode

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Enables/disables the phone microphone | AT*EMIC=<mode> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported, show supported values | AT*EMIC=? | • *EMIC: (list of supported <mode>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current settings | AT*EMIC? | • *EMIC: <mode><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Included for compatibility. No functionality.

| *<mode>* | *Description* |
|---|---|
| 0 | Microphone is disabled (off) |
| 1 | Microphone is enabled (on) |

## 4.8 AT*EMIR Ericsson Music Mute Indication Request

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request for mute indications | AT*EMIR=<mode> | • OK<br>• ERROR |
| Show supported message types along with the current service setting | AT*EMIR? | *EMIR: <mode>,<resp> |
| Show list of supported services | AT*EMIR=? | *EMIR: (list of supported <mode>s) |

Included for compatibility. No functionality.

| *<mode>* | *Description* |
|---|---|
| 0 | Off, music mute indication result codes will not be sent to the accessory |
| 1 | On, music mute indication result codes will be sent to the accessory |

| *<resp>* | *Description* |
|---|---|
| 0 | Music mute inactive |
| 1 | Music mute active |

## 4.9 AT*EXVC Ericsson SET External Volume Control

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets the maximum volume level on the audio lines | AT*EXVC=<external volume> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported and show the possible report settings | AT*EXVC=? | • *EXVC: (list of supported <external volume>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT*EXVC? | • *EXVC: <external volume><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Used to set or query whether an external accessory such as the vehicle handsfree controls the audio volume.

By default, the <external volume> is turned off, i.e. the volume over AFMS is controlled by the phone MMI.

The set command is effective only as long as the phone senses that it is connected to an external accessory that has issued the command. Once the phone and the accessory are disconnected the <external volume> setting returns to default.

| *<external volume>* | *Description* |
|---|---|
| 0 | The phone MMI controls audio volume over AFMS |
| 1 | Audio volume over AFMS is output at maximum level that is no clipping occurs. An external accessory such as a vehicle kit controls the actual volume level heard by the user |

# 5. Data - CSD/HSCSD

***Note!*** Since the modem does not support V42bis compression the following commands have not been implemented:

- AT+DS
- AT+DR

## *5.1 AT+CBST Select Bearer Service Type*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select bearer service type | AT+CBST=[<speed>, [<name>,[<ce>]]] | • OK<br>• ERROR |
| Read the command | AT+CBST? | • +CBST: <speed>,<name>, <ce><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CBST=? | • +CBST: (list of supported <speed>s,list of supported <name>s, list of supported <ce>s)<br>• OK<br>• ERROR |

Selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated. Values may also be used during mobile terminated data call setup, especially in the case of single numbering scheme calls.

Test command returns values supported by the TA as compound values.

| *<speed>* | *Description* |
|---|---|
| 0 | Auto selection of baud rate |
| 4 | 2400 bps V.22bis |
| 6 | 4800 bps V.32 |
| 7 | 9600 bps V.32 |
| 12 | 9600 bps V.34 |
| 15 | 19200 bps V.34 |
| 68 | 2400 bps V.110 (ISDN) |
| 70 | 4800 bps V.110 (ISDN) |
| 71 | 9600 bps V.110 (ISDN) |

| *<speed>* | *Description* |
|---|---|
| 75 | 14400 bps V.110 (ISDN) |
| 79 | 19200 bps V.110 (ISDN) |
| 80 | 28800 bps V.110 (ISDN) |
| 81 | 38400 bps V.110 (ISDN) |
| 82 | 48000 bps V.110 (ISDN) |
| 83 | 56000 bps V.110 (ISDN) |

| *<name>* | *Description* |
|---|---|
| 0 | Asynchronous connection (UDI or 3.1 kHz modem) |

| *<ce>* | *Description* |
|---|---|
| 1 | Non transparent |

## *5.2 AT+CRLP Radio Link Protocol*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set radio link protocol | AT+CRLP=[<iws> [,<mws>[,<T1> [,<N2>[,<ver> [, <T4>]]]]]] | • OK<br>• ERROR |
| Read the command | AT+CRLP? | • +CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1> [,<T4>]][<CR><LF><br>• +CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2> [,<T4>]][...]]<br>• OK<br>• ERROR |
| Test if the command is supported | AT+CRLP=? | • +CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported<N2>s)[,<ver1> [,(list of supported <T4>s)]] [<CR><LF>+CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s)[,<ver2>[,(list of supported <T4>s)]][...]]<br>• OK<br>• ERROR |

Radio link protocol (RLP) parameters used when non-transparent data calls are originated may be altered with this command. Available command subparameters depend on the RLP versions implemented by the device (e.g. <ver> may not be available if device supports only versions 0 and 1).

Read command returns current settings for each supported RLP version <verx>. Only RLP parameters applicable to the corresponding <verx> are returned.

Test command returns values supported by the TA as a compound value. If ME/TA supports several RLP versions <verx>, the RLP parameter value ranges for each <verx> are returned in a separate line.

| *<iws>* | *Description* |
|---|---|
| 120<br>0 - 496 | IWF to MS window size |

| *<mws>* | *Description* |
|---|---|
| 120<br>0 - 496 | MS to IWF window size |

| *<T1>* | *Description* |
|---|---|
| 48<br>38 - 100 | Acknowledgment timer T1 (*10ms) |

| *<N2>* | *Description* |
|---|---|
| 6<br>0 - 255 | Re-transmission attempts N2 |

| *<T4>* | *Description* |
|---|---|
| 5<br>3 - 255 | Re-sequencing period T4 (*10ms) |

| *<ver>* | *Description* |
|---|---|
| Integer | RLP version. When version indication is not present, <ver>=0 is assumed |

# 6. Data - GPRS

## *6.1 AT+CGACT PDP Context Activate or Deactivate*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Activate or deactivate the specified PDP context(s) | +CGACT=[<state> [,<cid>[,<cid>[,…]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGACT? | • +CGACT: <cid>, <state>[<CR><LF> +CGACT: <cid>, <state>[...]]<br>• OK<br>• ERROR |
| Test if the command is supported | +CGACT=? | • +CGACT: (list of supported <state>s)<br>• OK<br>• ERROR |

Used to activate or deactivate the specified PDP context(s).

After the command has completed, the MS remains in V.250 command state. If the MS is already in the requested state, the command is ignored and OK is returned. If the requested state cannot be achieved, ERROR or +CME: ERROR is returned. If the MS is not attached to the GPRS service when the activation form of the command is executed, the MS first performs a GPRS attach and then attempts to activate the specific contexts.

If no <cid>s are specified the activation form of the command activates all defined contexts.

If no <cid>s are specified the deactivation form of the command deactivates all active contexts.

| *<state>* | *Description* |
|---|---|
| 0 | PDP context activation deactivated |
| 1 | PDP context activation activated |

| *<cid>* | *Description* |
|---|---|
| Integer type | A numeric parameter which specifies a specific PDP context definition |

## 6.2 AT+CGATT GPRS Attach or Detach

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Attach or detach MS to the GPRS/packet domain/ packet domain service | +CGATT=[<state>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGATT? | • +CGATT: <state><br>• OK<br>• ERROR |
| Test if the command is supported | +CGATT=? | • +CGATT: (list of supported <state>s)<br>• OK<br>• ERROR |

Used to attach the MS to, or detach the MS from, the GPRS/packet domain service. After the command has completed, the MS remains in V.250 command state. If the MS is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses (enabled by the +CMEE command) are listed under "+CME ERROR (Mobile Equipment Error Code)", page 57.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

***Note!*** This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

| *<state>* | *Description* |
|---|---|
| 0 | Detached |
| 1 | Attached |

## 6.3 AT+CGDATA Enter Data State

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Establish GPRS/packet domain connection | +CGDATA=[<L2p>,[cid[,cid>[,…]]]] | • CONNECT<br>• ERROR<br>• OK<br>• ERROR |
| Test if the command is supported | +CGDATA=? | • +CGDATA: (list of supported <L2P>s)<br>• OK<br>• ERROR |

Causes the MS to perform whatever actions are necessary to establish communication between the TE and the network using one or more GPRS/packet domain PDP types. This may include performing a GPRS/packet domain attach and one or more PDP context activations.

| *<L2P>* | *Description* |
|---|---|
| PPP | Point-to-point protocol for a PDP such as IP |

## *6.4 AT+CGDCONT Define PDP Context*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select PDP context parameters | +CGDCONT=[<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp> [,<pd1> [,…[,pdN]]]]]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGDCONT? | • +CGDCONT: <cid>, <PDP_type>,<APN>, <PDP_addr>,<d_comp>, <h_comp>[,<pd1>[,…[,pdN]]] [<CR><LF>+CGDCONT: <cid>, <PDP_type>,<APN>, <PDP_addr>,<d_comp>, <h_comp>[,<pd1>[,…[,pdN]]] [...]]<br>• OK<br>• ERROR |
| Test if the command is supported | +CGDCONT=? | • +CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s) [,(list of supported <pd1>s) [,…[,(list of supported <pdN>s)]]] [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s) [,(list of supported <pd1>s)[,…[,(list of supported <pdN>s)]]] [...]]<br>• OK<br>• ERROR |

Specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

| *<cid>* | *Description* |
|---|---|
| Integer type | (PDP Context Identifier) a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MS interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command |
| 1-10 | Supported values. **Ericsson specific** |

| *<PDP_type>* | *Description* |
|---|---|
| IP | Internet Protocol (IETF STD 5) |

| *<APN>* | *Description* |
|---|---|
| String type | (Access Point Name) a string parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested |

| <*PDP_address*> | *Description* |
|---|---|
| String type | A string parameter that identifies the MS in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested |

| <*d_comp*> | *Description* |
|---|---|
| 0 | PDP data compression OFF |
| 1 | PDP data compression ON |
| 2..255 | Reserved |

| <*h_comp*> | *Description* |
|---|---|
| 0 | PDP header compression OFF |
| 1 | PDP header compression ON |
| 2..255 | Reserved |

| <*pdN*> | *Description* |
|---|---|
| String type | Zero to N string parameters whose meanings are specific to the <PDP_type> |

## 6.5 AT+CGEREP GPRS Event Reporting

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set command | +CGEREP=[<mode> [,<bfr>]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGEREP? | • +CGEREP: <mode>,<bfr><br>• OK<br>• ERROR |
| Test if the command is supported | +CGEREP=? | • +CGEREP: (list of supported <mode>s),(list of supported <bfr>s)<br>• OK<br>• ERROR |

Enables or disables the sending of unsolicited result codes, +CGEV: XXX from MS to TE in the case of certain events occurring in the GPRS/packet domain MS or the network.

| *<mode>* | *Description* |
|---|---|
| 0 | Buffer unsolicited result codes in the MS. No codes are forwarded to the TE |
| 1 | Discard unsolicited result codes when MS-TE link is reserved; otherwise forward them directly to the TE |

| *<bfr>* | *Description* |
|---|---|
| 0 | MS buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered |

## *6.6 AT+CGPADDR Show PDP Address*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Show PDP addresses for specified CIDs | +CGPADDR=[<cid> [,<cid> [,…]]] | • +CGPADDR: <cid>,<PDP_addr> [<CR><LF>+CGPADDR: <cid>,<PDP_addr> [...]]<br>• OK<br>• ERROR |
| Test if the command is supported | +CGPADDR=? | • +CGPADDR: (list of defined <cid>s)<br>• OK<br>• ERROR |

Returns a list of PDP addresses for the specified context identifiers. The test command returns a list of defined <cid>s.

| *<cid>* | *Description* |
|---|---|
| Integer type | Parameter which specifies a particular PDP context definition (see +CGDCONT command). If no <cid> is specified, the addresses for all defined contexts are returned |

| *<PDP_address>* | *Description* |
|---|---|
| String type | A string that identifies the MS in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available |

## 6.7 AT+CGQMIN Quality of Service Profile (Minimum Acceptable)

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set minimum acceptable profile | +CGQMIN=[<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGQMIN? | • +CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[<CR><LF>+CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[…]]<br>• OK<br>• ERROR |
| Test if the command is supported | +CGQMIN=? | • +CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s)[<CR><LF>+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s)[…]]<br>• OK<br>• ERROR |

Allows the TE to specify a minimum acceptable profile which is checked by the MS against the negotiated profile returned in the Activate PDP Context Accept message.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT command, the +CGQMIN command is effectively an extension to the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQMIN=<cid> causes the minimum acceptable profile for context number <cid> to become undefined. In this case no check is made against the negotiated profile.

| *<cid>* | *Description* |
|---|---|
| Integer type | Parameter which specifies a particular PDP context definition |

| <*precedence*> | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | High priority |
| 2 | Normal priority |
| 3 | Low priority |

| <*delay*> | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1-4 | Delay class |

| <*reliability*> | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1-5 | Reliability class |

| <*peak*> | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | Up to 1000 (8kbits/s) |
| 2 | Up to 2000 (16kbits/s) |
| 3 | Up to 4000 (32kbits/s) |
| 4 | Up to 8000 (64kbits/s) |
| 5 | Up to 16000 (128kbits/s) |
| 6 | Up to 32000 (256kbits/s) |
| 7 | Up to 64000 (512kbits/s) |
| 8 | Up to 128000 (1024kbits/s) |
| 9 | Up to 256000 (2048kbits/s) |

| <*mean*> | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | Best effort |
| 2 | 100 (~0.22bits/s) |
| 3 | 200 (~0.44bits/s) |
| 4 | 500 (~1.11bits/s) |
| 5 | 1000 (~2.2bits/s) |
| 6 | 2000 (~4.4bits/s) |
| 7 | 5000 (~11.1bits/s) |

| *<mean>* | *Description* |
|---|---|
| 8 | 10000 (~22 bits/s) |
| 9 | 20000 (~44 bits/s) |
| 10 | 50000 (~111 bits/s) |
| 11 | 100000 (~0.22 kbits/s) |
| 12 | 200000 (~0.44 kbits/s) |
| 13 | 500000 (~1.11 kbits/s) |
| 14 | 1000000 (~2.2 kbits/s) |
| 15 | 2000000 (~4.4 kbits/s) |
| 16 | 5000000 (~11.1 kbits/s) |
| 17 | 10000000 (~22 kbits/s) |
| 18 | 20000000 (~44 kbits/s) |
| 31 | 50000000 (~111 kbits/s) |

## *6.8 AT+CGQREQ Quality of Service Profile (Requested)*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set quality of service profile | +CGQREQ=[<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the command | +CGQREQ? | • +CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[<CR><LF>+CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[…]]<br>• OK<br>• ERROR |
| Test if the command is supported | +CGQREQ=? | • +CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) [<CR><LF>+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s)[…]]<br>• OK<br>• ERROR |

Allows the TE to specify a quality of service profile that is used when the MS sends an activate PDP context request message to the network.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT command, the +CGQREQ command is effectively an extension to the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQREQ= <cid> causes the requested profile for context number <cid> to become undefined.

| *<cid>* | *Description* |
|---|---|
| Integer type | Parameter which specifies a particular PDP context definition |

| *<precedence>* | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | High priority |
| 2 | Normal priority |
| 3 | Low priority |

| *<delay>* | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1-4 | Delay class |

| *<reliability>* | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1-5 | Reliability class |

| *<peak>* | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | Up to 1000 (8kbits/s) |
| 2 | Up to 2000 (16kbits/s) |
| 3 | Up to 4000 (32kbits/s) |
| 4 | Up to 8000 (64kbits/s) |
| 5 | Up to 16000 (128kbits/s) |
| 6 | Up to 32000 (256kbits/s) |
| 7 | Up to 64000 (512kbits/s) |
| 8 | Up to 128000 (1024kbits/s) |
| 9 | Up to 256000 (2048kbits/s) |

| *<mean>* | *Description* |
|---|---|
| 0 | Subscribed (from network) value used |
| 1 | Best effort |
| 2 | 100 (~0.22 bits/s) |
| 3 | 200 (~0.44 bits/s) |
| 4 | 500 (~1.11 bits/s) |
| 5 | 1000 (~2.2 bits/s) |
| 6 | 2000 (~4.4 bits/s) |
| 7 | 5000 (~11.1 bits/s) |
| 8 | 10000 (~22 bits/s) |
| 9 | 20000 (~44 bits/s) |
| 10 | 50000 (~111 bits/s) |
| 11 | 100000 (~0.22 kbits/s) |
| 12 | 200000 (~0.44 kbits/s) |
| 13 | 500000 (~1.11 kbits/s) |
| 14 | 1000000 (~2.2 kbits/s) |
| 15 | 2000000 (~4.4 kbits/s) |
| 16 | 5000000 (~11.1 kbits/s) |
| 17 | 10000000 (~22 kbits/s) |
| 18 | 20000000 (~44 kbits/s) |
| 31 | 50000000 (~111 kbits/s) |

## 6.9 AT+CGREG GPRS Network Registration Status

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set command | AT+CGREG=[<n>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current settings | AT+CGREG? | • +CGREG: <n>,<stat>[,<lac>, <ci>]<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CGREG=? | • +CGREG: (list of supported <n>s)<br>• OK<br>• ERROR |

Controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the GPRS/packet domain network registration status of the MS, or code +CGREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell.

***Note!*** If the GPRS/Packet Domain MS also supports circuit mode services, the +CGREG command and +CGREG: result code apply to the registration status and location information for those services.

| *<n>* | *Description* |
|---|---|
| 0 | Disable network registration unsolicited result code |
| 1 | Enable network registration unsolicited result code |
| 2 | Enable network registration and location information unsolicited result code |

| *<stat>* | *Description* |
|---|---|
| 0 | Not registered, MS is not searching for a new operator to register with |
| 1 | Registered, home network |
| 2 | Not registered, but MS is searching for a new operator to register with |
| 3 | Registration denied |
| 4 | Unknown |
| 5 | Registered, roaming |

| *<lac>* | *Description* |
|---|---|
| String type | Two byte location area code in hexadecimal format |

| *<ci>* | *Description* |
|---|---|
| String type | Two byte cell ID in hexadecimal format |

## *6.10 AT+CGSMS Select Service for MO SMS Messages*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set service or service preference | +CGSMS=[<service>] | • OK<br>• ERROR |
| Read the command | +CGSMS? | • +CGSMS: <service><br>• OK<br>• ERROR |
| Test if the command is supported | +CGSMS=? | • +CGSMS: (list of available <service>s)<br>• OK<br>• ERROR |

Used to specify the service or service preference that the MS will use to send MO SMS messages. The read command returns the currently selected service or service preference.

| *<services>* | *Description* |
|---|---|
| 2 | GPRS/packet domain preferred (use circuit switched if GPRS/packet domain not available) |
| 3 | Circuit switched preferred (use GPRS/packet domain if circuit switched not available) |

# 7. Data - HSCSD

## *7.1 AT+CHSC HSCSD Current Call Parameters*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Show current HSCSD call parameters | AT+CHSC | • +CHSC:<rx>,<tx>,<aiur>,<coding><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if command is supported | AT+CHSC=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

Returns information about the current HSCSD call parameters, i.e. the current number of receive and transmit timeslots, air interface user rate and channel coding.

| *<rx>* | *Description* |
|---|---|
| 0 | No HSCSD call is active. See also note below |
| 1 | The number of receive timeslots currently in use is 1 |
| 2 | The number of receive timeslots currently in use is 2 |

| *<tx>* | *Description* |
|---|---|
| 0 | No HSCSD call is active. See also note below |
| 1 | The number of transmit timeslots currently in use is 1 |

| *<aiur>* | *Description* |
|---|---|
| 0 | No HSCSD call is active. See also note below. |
| 1 | Current air interface user rate is 9.6kbits/s |
| 3 | Current air interface user rate is 19.2kbits/s |

| *<coding>* | *Description* |
|---|---|
| 0 | No HSCSD call is active. See also note |
| 4 | Current channel coding is 9.6kbits/s (TCH/F9.6) |
| 8 | Current channel coding is 14.4kbits/s (TCH/F14.4) |

## *7.2 AT+CHSD HSCSD Device Parameters*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Show HSCSD features supported by the ME/TA | AT+CHSD | • +CHSD: <mclass>,<maxRx>, <maxTx>,<sum>,<codings><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if command is supported | AT+CHSD=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

Shows information about HSCSD features supported by the ME/TA.

| *<mclass>* | *Description* |
|---|---|
| 2 | Multislot class is 2 |

| *<maxRx>* | *Description* |
|---|---|
| 2 | Maximum number of receive timeslots that ME can use is 2 |

| *<maxTx>* | *Description* |
|---|---|
| 1 | Maximum number of transmit timeslots that ME can use is 1 |

| *<sum>* | *Description* |
|---|---|
| 3 | Total number of receive and transmit timeslots that ME can use at the same time is 3 (i.e. 2+1). The following applies in a HSCSD call: 2 (receive slots) + (transmit slots) <sum> |

| *<codings>* | *Description* |
|---|---|
| 4 | Indicates that the accepted channel coding for the next established non-transparent HSCSD call is 9.6kbits/s only |

## 7.3 AT+CHSN HSCSD Non Transparent Call Configuration

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set HSCSD configuration. This command is also used during a call if new <wAiur> and/or <wRx> are/is desired | AT+CHSN=[<wAiur> [,<wRx>[,<topRx> [,<codings>]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show current non-transparent HSCSD setting | AT+CHSN? | • +CHSN: <wAiur>, <wRx>, <topRx>, <codings><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if command is supported and show parameter ranges | AT+CHSN=? | • +CHSN: (list of supported <wAiur>s), (list of supported <wRx>s), (list of supported <topRx>s), (list of supported <codings>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Controls parameters for non-transparent HSCSD calls. Changing <topRx> or <codings> during a call does not affect the current call. Changing <wAiur> or <wRx> affects the current call only if <topRx> was non-zero when the call was established. When using the command in this way it comes in the “action” command category. This is what is referred to as user initiated up- and down-grading in GSM 02.34 and GSM 03.34.

***Note!*** Recommended value for parameter <speed> in AT+CBST is 0.

| *<wAiur>* | *Description* |
|---|---|
| 0 | TA/ME shall calculate a proper number of receive timeslots from currently selected fixed network user rate (<speed> parameter from +CBST command, and <codings>, and <wRx> (or <maxRx> from +CHSD command if <wRx>=0) |
| 1 | Wanted air interface user rate is 9.6kbit/s |
| 2 | Wanted air interface user rate is 14.4kbit/s |
| 3 | Wanted air interface user rate is 19.2kbit/s |
| 4 | Wanted air interface user rate is 28.8kbit/s |

| *<wRx>* | *Description* |
|---|---|
| 0 | TA/ME shall calculate a proper number of receive timeslots from currently selected <wAiur> and <codings> See note below |
| 1 | Wanted number of receive timeslots is 1 |
| 2 | Wanted number of receive timeslots is 2 |

| *<topRx>* | *Description* |
|---|---|
| 0 | Indicates that the user is not going to change <wAiur> and /or <wRx> during the next call |
| 1 | Top value for <wRx> that user is going to request during the next established non-transparent HSCSD call is 1 |
| 2 | Top value for <wRx> that user is going to request during the next established non-transparent HSCSD call is 2 |

| *<codings>* | *Description* |
|---|---|
| 4 | Indicates that the accepted channel coding for the next established non-transparent HSCSD call is 9.6kbit/s only |

## *7.4 AT+CHSR HSCSD Parameters Report*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set HSCSD parameters reporting on or off | AT+CHSR=[<mode>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show current setting | AT+CHSR? | • +CHSR: <mode><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if command is supported and show parameter range | AT+CHSR=? | • +CHSR: (list of supported <modes>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

With this command enabled, the intermediate result code +CHSR: <rx>,<tx>,<aiur>,<coding> is returned (from TA to TE) when an HSCSD call is being set up. The result code represents the current (negotiated or renegotiated) HSCSD parameters. If enabled, the intermediate result code is transmitted at the point of the call setup negotiation, where the ME/TA has determined what type of HSCSD connection will be used. Result code transmission is done after possible service (CR), error control (+ER), and/or compression (+DR) reporting, but before possible TE-TA rate (+ILRR) reporting and before the intermediate result code CONNECT is transmitted. The format of the intermediate result code is:

+CHSR: <rx>,<tx>,<aiur>,<coding>

For the value definitions, refer to "AT+CHSC HSCSD Current Call Parameters", page 123. For instance, for a non-transparent HSCSD call, result code 'CHSR: 2, 1, 4, 8' means that the call has two timeslots

downlink, one timeslot uplink, the air interface user rate is 28.8 kbits/s and the used channel coding is
TCH/F14.4.

| *<mode>* | *Description* |
|---|---|
| 0 | Disable reporting |
| 1 | Enable reporting |

Itermediate Result Codes:

+CHSR: <rx>,<tx>,<aiur>,<coding>

## *7.5 AT+CHSU HSCSD Automatic User Initiated Upgrading*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set HSCSD automatic user initiated upgrading on or off | AT+CHSU=[<mode>] | • OK<br>• ERROR |
| Show current setting | AT+CHSU? | • +CHSU=<mode><br>• OK<br>• ERROR |
| Test if command is supported and show parameter range | AT+CHSU=? | • +CHSU: (list of supported <modes>s)<br>• OK<br>• ERROR |

Enables or disables the HSCSD automatic user-initiated upgrade.

| *<mode>* | *Description* |
|---|---|
| 0 | Disable use of UP bit for upgrading. **Default value** |
| 1 | Enable use of UP bit for upgrading |

# 8. Fax

## *8.1 AT*E2FAX Ericsson M2M Fax Comm. Baud Rate Modification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request change of fax comm. baud rate | AT*E2FAX= <RcV> | • ERROR<br>• OK |
| Displays currently set rate | AT*E2FAX? | • *E2FAX: <RcV><br>• ERROR |
| Shows if the command is supported | AT*E2FAX=? | • *E2FAX: (list of supported <RcV>s)<br>• ERROR |

This command allows the modification of the factory default RS232 comm. setting between standard 9600 baud and 19200 baud. This is needed as the addition of fax capabilities, within the module, require communication between fax applications and the module to run at a higher baud rate than the fax transmission baud rate (In this case the fastest transmission rate is 9600 baud). Once this command has been performed, the user must then execute the AT&F command to reset the module with the new RS232 comm's baud rate.

The AT*E2FAX command allows the user to:

- "Configure" the RS232 Comm. speed default factory profile, specifying whether the speed should be 9600 baud (standard) or 19200 baud for FAX application comm. This value will then be used once the AT&F command is next used.
- "Read" what value this default factory profile has been set to.

| *<RcV>* | *Description* |
|---|---|
| 0 | Configure RS232 default setting to 9600 baud |
| 1 | Configure RS232 default setting to 19200 baud |

*Examples*

AT*E2FAX=?

*E2FAX= (0-1)
OK

AT*E2FAX?

*E2FAX: 0 (Current default setting is 19200 baud)
OK

AT*E2FAX=0

OK (Sets default RS232 setting to 9600 baud)

## *8.2 Low Level Fax Commands*

The following table of low level fax commands are supported and used by the GM29 for fax operation.

| | | |
|---|---|---|
| AT+FAA | AT+FBADLIN | AT+FBADMUL |
| AT+FBOR | AT+FBUG | AT+FCIG |
| AT+FCLASS | AT+FCQ | AT+FCR |
| AT+FDCC | AT+FDFFC | AT+FDIS |
| AT+FDR | AT+FDT | AT+FECM |
| AT+FET | AT+FK | AT+FLID |
| AT+FLNFC | AT+FLPL | AT+FMDL? |
| AT+FMFR? | AT+FMI? | AT+FMINSP |
| AT+FMM? | AT+FMR? | AT+FPHCTO |
| AT+FPTS | AT+FRBC | AT+FREL |
| AT+FREV? | AT+FRH | AT+FRM |
| AT+FRS | AT+FSPL | AT+FTBC |
| AT+FTH | AT+FTM | AT+FTS |
| AT+FVRFC | AT+FWDFC | |

# 9. Identification

## *9.1 AT* *Attention Command*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Checks the communication between the MS and application | AT | • OK<br>• +CME ERROR <err> |

This command is used to determine the presence of an MS. If the MS supports AT commands, it returns an OK final result code.

## *9.2 AT&F* *Set to Factory Defined Configuration*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute | AT&F | • OK<br>• ERROR |
| Show if supported and list available parameter range | AT&F=? | &F: (list of supported <profile>s) |

This command instructs the DCE to set all parameters to default values specified by the manufacturer, which may take in consideration hardware configuration and other manufacturer defined criteria.

## *9.3 AT&W* *Store User Profile*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Stores the current user profile to non volatile memory | AT&W=[<pr>] or AT&W[<pr>] | • OK<br>• ERROR |
| Show if the command is supported | AT&W=? | &W: (list of supported <pr>s) |

This command stores the current user profile in non-volatile memory.

| *< pr>* | *Description* |
|---|---|
| 0 | Stores current settings in User Profile 0 |

## 9.4 AT* List all Supported AT Commands

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| List all implemented AT commands | AT* | <AT Command1> [<CR><LF><AT Command2>[…]]<br>/<br><AT Command1> [<CR><LF><AT Command2>[…]] |

Lists all the commands supported by the MS.

## 9.5 AT+CGMI Read MS Manufacturer Identification

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request manufacturer identification | AT+CGMI | • <manufacturer><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CGMI=? | • OK<br>• ERROR |

Causes the MS to return one or more lines of information text.

| *<manufacturer>* | *Description* |
|---|---|
| Sony Ericsson | This company's name is displayed |

## 9.6 AT+CGMM Read MS Model Identification

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request the model identification | AT+CGMM | • <model type><br><model name><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CGMM=? | • OK<br>• ERROR |

Causes the MS to return one or more lines of information text <model>, determined by the MS manufacturer. It is intended to permit the user of the ITAE/ETAE to identify the specific model of the MS to which it is connected. Typically the text will consist of a single line containing the name of the product, but manufacturers may choose to provide more information if desired.

| *<model type>* | *Description* |
|---|---|
| String type | A unique ASCII character/digit string, always 10 characters long. Spaces are used when the number of characters/digits is less than 10 |

| *<model name>* | *Description* |
|---|---|
| String type | Model name for the transceiver unit, for example, GM29 |

## *9.7 AT+CGMR Read MS Revision Identification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request MS revision identification string | AT+CGMR | • <revision><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CGMR=? | • OK<br>• ERROR |

This command causes the MS to return a string containing information about the software version.

| *<revision>* | *Description* |
|---|---|
| String type | An ASCII string containing date (year, month, day, hour, minute) plus KRC number.<br>Example: 9710051610 CXC125112 |

## *9.8 AT+CGSN Read MS Product Serial Number Identification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request product serial number | AT+CGSN | • <sn><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CGSN=? | • OK<br>• ERROR |

This command causes the MS to return the IMEI (International Mobile station Equipment Identity), which identifies the individual ME.

| *<sn>* | *Description* |
|---|---|
| String | The IMEISV, which is the IMEI (International Mobile station Equipment Identity; refer GSM 03.03) number of the ME and the software version number. Text shall not contain the sequence 0<CR> or OK<CR> |

## *9.9 ATI Identification Information*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute | ATI[<value>] | <information> |

This command causes the DCE to transmit one or more lines of text, followed by a final result code. As an option, <value> can be used to select from among multiple types of identifying information as shown in the table below.

This command provides compatibility with Microsoft Windows 95.

| *<value>* | *Description* |
|---|---|
| 0 | Same information as +GMM command (model identification) |
| 1 | Same information as +GMR command (revision identification) |
| 3 | Modem model description |
| 5 | Active settings |
| 7 | Modem configuration profile (brief listing of the modem functionality: fax classes, Bluetooth, IrDA, modem type, etc.) |
| 8 | DCE hardware type version |
| 9 | PnP (plug and play) information |

## *9.10 AT+GCAP Request Modem Capabilities List*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request complete capability list | AT+GCAP | +GCAP: (list of supported <capability>s) |
| Test if command is supported | AT+GCAP=? | • OK<br>• ERROR |

Returns a list of valid modem command prefixes.

| *<capability>* | *Description* | *GSM* | *3G1 single mode* | *3G1 dual mode* |
|---|---|---|---|---|
| +CGSM | GSM commands | Supported | Supported | Supported |
| +FCLASS | Facsimile class 1 and 2 commands | Supported | Not supported | Not supported |
| +DS | V.42 bis compression | Supported | Not supported | Supported (only for Circuit Switched data calls in a GSM network) |

# 10. Interface

## *10.1 AT+CPIN PIN Control*

See 3.23, AT+CPIN PIN Control

## *10.2 AT&C Circuit 109 (DCD) Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set behavior of carrier detect | AT&C[<value>] | OK<br>ERROR |

Determines the behaviour of the carrier detect.

| *<value>* | *Description* |
|---|---|
| 0 | DCD always on |
| 1 | DCD follows the connection. **Default value** |

## *10.3 AT&D Circuit 108 (DTR) Response*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Control actions from DTE | AT&D[<value>] | OK<br>ERROR |

Controls all actions initiated by data terminal ready from DTE.

| *<value>* | *Description* |
|---|---|
| 0 | Ignore. **Default value** |
| 1 | When in on-line data mode, switch to on-line command mode. For all other states, see <value>=2 |
| 2 | Disconnect and switch to off-line command mode |

## *10.4 AT&S Circuit 107 (DSR) Response*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set behaviour of data set ready | AT&S[<value>] | • OK<br>• ERROR |

Determines the behaviour of the data set ready signal.

| *<value>* | *Description* |
|---|---|
| 0 | DSR always on |
| 1 | DSR on in data mode. DSR off in command mode. **Default value** |

## *10.5 AT+WS46 Mode Selection*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets the cellular protocol mode | AT+WS46=n | • OK<br>• ERROR |
| Queries the current cellular protocol mode | AT+WS46? | • <n> OK<br>• ERROR |
| Queries the possible cellular protocol modes | AT+WS46=? | • (list of supported <n>s) OK<br>• ERROR |

Allows an accessory to query and control the cellular protocol mode of the phone.

| *<n> parameter* | *Description* |
|---|---|
| 12 | This value is used for GSM at 900 Mhz., DCS-1800, and PCS-1900 phones |

## 10.6 ATE Command Echo

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request Command Echo | ATE[<value>]<br>ATE=[<value>] | • OK<br>• ERROR |
| Show the current setting | ATE? | <value> |
| Show if the command is supported | ATE=? | E: (list of supported <value>s) |

The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state.

| *<value>* | *Description* |
|---|---|
| 0 | DCE does not echo characters during command state and online command state |
| 1 | DCE echoes characters during command state and online command state. **Default value** |

## 10.7 ATV DCE Response Format

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set DCE response format | ATV[=]<value> | • OK<br>• ERROR |
| Read the current setting | ATV? | V: <value> |
| Show if the command is supported | ATV=? | V: (list of supported <value>s) |

Select either descriptive or numeric response codes. The ATV command sets the verbose numeric response codes and strips off the <S3><S4> additions to the command response.

| *<value>* | *Description* |
|---|---|
| 0 | Display numeric result codes |
| 1 | Display verbose result codes. **Default value** |

List of result codes

| *ATV1/ATV=1* | *ATV0/ATV=0* | *Description* |
|---|---|---|
| OK | 0 | Acknowledges execution of a command |
| CONNECT | 1 | A connection has been established; the DCE is moving from command state to online data state |
| RING | 2 | The DCE has detected an incoming call signal from the network |
| NO CARRIER | 3 | The connection has been terminated or the attempt to establish a connection failed |
| ERROR | 4 | Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line |
| NO DIALTONE | 6 | No dial tone detected |
| BUSY | 7 | Engaged (busy) signal detected |
| NO ANSWER | 8 | **"**@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer |
| CONNECT <TEXT> | Manufacturer-specific | Same as CONNECT, but includes manufacturer-specific text that may specify DTE speed, line speed, error control, data compression, or other status |

## *10.8 ATZ Reset to Default Configuration*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute | ATZ | • OK<br>• ERROR |
| Execute | ATZ=<profile> | • OK<br>• ERROR |
| Show if supported and list available parameter range | ATZ=? | Z: (list of supported <profile>s) |

This command instructs the DCE to set all parameters to their default values as specified by the user. Consider hardware configuration switches or non-volatile parameter storage (if implemented) when using this command.

Commands included on the same command line as the Z command will be ignored.

| *<profile >* | *Description* |
|---|---|
| 0 | Select the user profile to restore |

## *10.9 AT+CMUX Switch to 07.10 Multiplex Protocol*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Switch to 07.10 | AT+CMUX=<transparency>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]] | +CME ERROR: <err> |
| Returns current setting for multiplexer | AT+CMUX? | • +CMUX:<transparency>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>[,<k>]<br>• +CME ERROR: <err> |
| Show list of supported services | AT+CMUX=? | • +CMUX: (list of supported <transparency>s), (list of supported <subset>s), (list of supported <port_speed>s), (list of supported <N1>s), (list of supported <T1>s), (list of supported <N2>s), (list of supported <T2>s), (list of supported <T3>s), (list of supported <k>)<br>• +CME ERROR: <err> |

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The command is used to turn on the multiplexer. Only “no transparency is supported”. The parameter <k> is not used.

The default values for the parameters below are for “no transparency” and “only UIH frames used”.

| *<transparency>* | *Description* |
|---|---|
| 0 | No transparency |

| *<subset>* | *Description* |
|---|---|
| 0 | Only UIH frames used |

| *<port_speed>* | *Description* |
|---|---|
| 1 | 9600 bits/s |
| 2 | 19200 bits/s |
| 3 | 38400 bits/s |
| 4 | 57600 bits/s |
| 5 | 115200 bits/s |
| 6 | 230400 bits/s |
| 7 | 460800 bits/s |

| *<N1>* | *Description* |
|---|---|
| 31 | Default maximum frame size |

| *<T1>* | *Description* |
|---|---|
| 10 | 100ms default timer |

| *<N2>* | *Description* |
|---|---|
| 3 | Default maximum number of re-transmissions |

| *<T2>* | *Description* |
|---|---|
| 30 | 300ms default timer |

| *<T3>* | *Description* |
|---|---|
| 10 | 10s default timer |

| *<k>* | *Description* |
|---|---|
| 1..7 | Window size |

## *10.10 AT+CRES Restore SMS Settings*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Restore settings | AT+CRES[=<profile>] | • +CMS ERROR: <err><br>• OK<br>• ERROR |
| Get available profiles | AT+CRES=? | • +CRES: (list of supported <profile>s)<br>• +CMS ERROR: <err><br>• OK<br>• ERROR |

Restores message service settings from non-volatile memory to active memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB (if implemented) are restored. Certain settings, such as SIM SMS parameters, cannot be restored.

| *<profile>* | *Description* |
|---|---|
| 0..2 | Profile number where settings are to be stored. **Default value is 0** |

## *10.11 AT+ICF Cable Interface Character Format*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Defines DTE-DCE character framing | AT+ICF=[format[,parity]] | • OK<br>• ERROR |
| Read the current setting | AT+ICF? | • +ICF: <format>,<parity><br>• OK<br>• ERROR |
| Show if the command is supported | AT+ICF=? | • +ICF: (list of supported <format>s), (list of supported <parity>s)<br>• OK<br>• ERROR |

This extended-format compound parameter is used to determine the local serial port start-stop (asynchronous) character framing used by the DCE to accept DTE commands, and while transmitting information text and result code, if this is not automatically determined; **(Not supported)** +IPR=0 forces +ICF=0 (see +IPR).

| *<format>* | *Description* |
|---|---|
| 3 | 8 Data 1 Stop. **Default value** |

| *<parity>* | *Description* |
|---|---|
| 3 | Space. **Default value** |

## *10.12 AT+IFC DTE-DCE Local Flow Control*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Defines DTE-DCE local flow control | AT+IFC=[<by_te>, [<by_ta>]] | • OK<br>• ERROR |
| Read the current setting | AT+IFC? | +IFC: <by_te>,<by_ta> |
| Show if the command is supported | AT+IFC=? | +IFC: (list of supported <by_te>s,<by_ta>s) |

Defines the flow control between the modem and the computer when in on-line data mode.

No flow control is enabled in any of the command modes.

| *<by_te>* | *Description* |
|---|---|
| 0 | No flow control on DTE |
| 1 | Xon/Xoff flow control on DCE. Control characters are removed by the DCE interface |
| 2 | RTS flow control on DCE. **Default value** |
| 3 | Xon/Xoff flow control on DCE. Control characters are passed to the remote DCE/DTE |

| *<by_ta>* | *Description* |
|---|---|
| 0 | No flow control on DCE |
| 1 | Xon/Xoff flow control on DTE |
| 2 | CTS flow control on DCE. **Default value** |

## *10.13 AT+ILRR Cable Interface Local Rate Reporting*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Defines DTE-DCE character framing | AT+ILRR=<value> | • OK<br>• ERROR |
| Read the current setting | AT+ILRR? | +ILRR:<value> |
| Show if the command is supported | AT+ILRR=? | +ILRR:(list of supported <values>s) |

Specifies whether or not the extended-format "+ILRR:<rate>" information text is transmitted from the DCE to the DTE. The <rate> reported shall represent the current (negotiated or renegotiated) DTE-DCE rate. If enabled, the intermediate result code is transmitted after any modulation, error control or data compression reports are transmitted, and before any final result code (e.g. CONNECT) is transmitted. The <rate> is applied after the final result code is transmitted.

| *<value>* | *Description* |
|---|---|
| 0 | Disables reporting of local port rate (+ILRR: is not transmitted). **Default value** |
| 1 | Enables reporting of local port rate (+ILRR: is transmitted) |

## *10.14 AT+IPR Cable Interface Port Command*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Defines fixed DTE rate | AT+IPR=[rate] | • OK<br>• ERROR |
| Read the current setting | AT+IPR? | • +IPR:<rate><br>• OK<br>• ERROR |
| Show if the command is supported | AT+IPR=? | • +IPR: (), (list of fixed-only <rate>s)]<br>• OK<br>• ERROR |

Specifies the data rate at which the DCE will accept commands, in addition to 1200 bits/s or 9600 bits/s (as required in v25ter, subclause 4.3). It may be used to select operation at rates used by the DTE, which the DCE is not capable of automatically detecting.

The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

| *<rate>* | *Description* |
|---|---|
| Discrete integer value | The <rate> value specified shall be the rate in bits per second at which the DTE-DCE interface should operate, e.g. “19200” or “115200”. The rates supported by a particular DCE are manufacturer specific.<br><br>The following rates, are supported;<br>1200<br>2400<br>4800<br>9600<br>19200<br>38400<br>57600<br>115200<br>230400<br>460800 |

## *10.15 AT*E2ESC M2M Escape Sequence Guard Time*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Set GPRS online command guard time | AT*E2ESC=[<gt>] | • OK<br>• ERROR |
| Read the current setting | AT*E2ESC? | *E2ESC: <gt> |
| Show if the command is supported | AT*E2ESC=? | • OK<br>• ERROR |

Defines a guard time for the escape sequence in GPRS to return to on-line command mode i.e. if +++AT<CR> is received either as part of the data stream or a terminating string from the application and no further data is received for the duration of the guard time the modem will go

into on line command mode. This guards against the modem accidentally going into on line command mode. The verbose format of +++AT<CR> is <S2><S2><S2>AT<S3>.

| *<gt>* | *Description* |
|---|---|
| 0 | No guard time. **Default value** |
| 1-10 | Guard time in seconds |

# 11. Network

## *11.1 AT*E2CD Ericsson M2M Cell Description*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request network cell description | AT*E2CD=<n> | • ERROR<br>• OK |
| Read the command | AT*E2CD? | • *E2CD: <n>,<lac>,<ci>,<ta><br>• ERROR |
| Show if the command is supported | AT*E2CD=? | • *E2CD: (list of supported <n>s)<br>• ERROR |

Controls the presentation of an unsolicited result code E2CD: when <n>=1, or when there is a change in one of the network cell parameters, E2CD: <lac>,<ci>,<ta>.

Read command returns the status of result code presentation and several values, which show the network cell parameters.

Location information <lac>, <ci> and <ta> are returned only when <n>=1 and the ME is registered in the network. To know if the ME is registered use the AT+CREG command. If the ME is not registered in the cellular network an ERROR message is returned.

| *<n>* | *Description* |
|---|---|
| 0 | Disable network location information unsolicited result code. **Default value** |
| 1 | Enable network location information unsolicited result code *E2CD: <lac>,<ci>,<ta> |

| *<lac>* | *Description* |
|---|---|
| String type | Two byte location area code in hexadecimal format |

| *<ci>* | *Description* |
|---|---|
| string type | Two byte cell ID in hexadecimal format |

| *<ta>* | *Description* |
|---|---|
| 0-63 | According to GSM 04.18 V8.6.0, the coding of the timing advance value is the binary representation of the timing advance in bit periods; 1 bit period = 48/13 is. <ta> is the integer representation of the timing advance in binary format |
| 64-255 | Reserved |

## *11.2 AT*E2EMM Ericsson M2M Engineering Monitoring Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set the response presentation mode | AT*E2EMM=<n>[,<m>] | • ERROR<br>• OK |
| Display mode neighbour cells are taken from the toplist | | *E2EMM:<br>Serving Cell<br>MCC,MNC,LAC,CellID,BSIC,Ch[,RxL,C1,C2][,RxLFull,RxLSub,RxQFull,RxQSub,TA,TN],<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>[,<rxl>,<c1>,<c2>][,<rxlFull>,<rxlSub>,<rxqfull>,<rxqsub>,<ta>,<tn>],<br>NeighBours Cells<br>MCC,MNC,LAC,CellID,BSIC,Ch,RxL[,C1,C2],<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>…<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>OK |
| Compact mode. The first cell is the serving cell, the rest are neighbour cells taken from the toplist | | *E2EMM: <mcc>,<mnc>,<ci>,<bsic>,<ch>[,<rxl>][,<rxlSub>,<rxqsub>,<ta>],<mcc>,<mnc>,<ci>,<bsic>,<ch>, <rxl>,<mcc>,<mnc>,<ci>,<bsic>,<ch>,<rxl>,<br>…<br><mcc>,<mnc>,<ci>,<bsic>,<ch>,<rxl><br>OK |
| Verbose mode. The first cell is the serving cell and the rest are neighbour cells as provided by the network in the system info. messages (2 and 5) and via the AT*E2NBTS command | | *E2EMM: <mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>[,<rxl>,<c1>,<c2>][,<rxlFull>,<rxlSub>,<rxqfull>,<rxqsub>,<ta>,<tn>],<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>…<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>OK |
| Reduced display mode - info. as display mode but without text headings or <CR><LF> separators, neighbour cells from top list | | *E2EMM: <mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>[,<rxl>,<c1>,<c2>][,<rxlFull>,<rxlSub>,<rxqfull>,<rxqsub>,<ta>,<tn>],<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>…<br><mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<br>OK |
| Read the command | AT*E2EMM? | • *E2EMM: <n><br>• ERROR |
| Show if the command is supported | AT*E2EMM=? | • *E2EMM: (list of supported <n>s),(list of supported <m>s)<br>• ERROR |

There are four presentation format modes (Display, Compact, Verbose,

and Reduced Display) and two response types (one shot response or continuous unsolicited responses).

The purpose of the presentation format mode Display is to display the data in a readable form, including headers and line breaks (<CR><LF>). This format is, however, not well suited for machine decoding. The formats Verbose, Compact and Reduced Display do not have headers or line breaks. Verbose mode displays more parameters than the compact mode.

The response types give the user the choice of one a shot information or an unsolicited response with <m> seconds between each response.

*Examples*

**AT*E2EMM=1**
*E2EMM:<CR><LF>
Serving Cell<CR><LF>
MCC,MNC,LAC,CellID,BSIC,Ch[,RxL,C1,C2][,RxLFull,RxLSub,
RxQFull,RxQSub,TA,TN]<CR><LF>
<mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>[,<rxl>,<c1>,<c2>][,<rxlFull>,
<rxlSub>,<rxqfull>,<rxqsub>,<ta>,<tn>]<CR><LF>
NeighBours Cells<CR><LF>
MCC,MNC,LAC,CellID,BSIC,Ch,RxL[,C1,C2]<CR><LF>
<mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<CR><LF>
<mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<CR><LF>
…
<mcc>,<mnc>,<lac>,<ci>,<bsic>,<ch>,<rxl>[,<c1>,<c2>]<CR><LF>
OK

**AT*E2EMM=3**
*E2EMM: <servcell mcc>,<servcell mnc>,<servcell ci>,
<servcell bsic>,<servcell ch>[,<servcell rxl>][,<servcell rxlSub>,
<servcell rxqsub>,<servcell ta>],<neighborcell1 mcc>,
<neighborcell1 mnc>,<neighborcell1 ci>,<neighborcell1 bsic>,
<neighborcell1 ch>,<neighborcell1 rxl>,<neighborcell2 mcc>,
<neighborcell2 mnc>,<neighborcell2 ci>,<neighborcell2 bsic>,
<neighborcell2 ch>,<neighborcell2 rxl>,
…
<neighborcelln mcc>,<neighborcellnmnc>,<neighborcellnci>,
<neighborcelln bsic>,<neighborcelln ch>,<neighborcelln rxl>
<CR><LF>
OK

**AT*E2EMM=5**
*E2EMM: <servcell mcc>,<servcell mnc>,<servcell lac>,
<servcell ci>,<servcell bsic>,<servcell ch>[,<servcell rxl>,
<servcell C1>,<servcell C2>][,<servcell rxlFull>,<servcell rxlSub>,
<servcell rxqfull>,<servcell rxqsub>,<servcell tn>,<servcell ta>],
<neighborcell1 mcc>,<neighborcell1 mnc>,<neighborcell1 lac>,

<neighborcell1 ci>,<neighborcell1 bsic>,<neighborcell1 ch>,
<neighborcell1 rxl>[,<neighborcell1 C1>,<neighborcell1 C2>],
<neighborcell2 mcc>,<neighborcell2 mnc>,<neighborcell2 lac>,
<neighborcell2 ci>,<neighborcell2 bsic>,<neighborcell2 ch>,
<neighborcell2 rxl>[,<neighborcell2 C1>,<neighborcell2 C2>],
…
<neighborcelln mcc>,<neighborcellnmnc>,<neighborcelln lac>,
<neighborcelln ci>,<neighborcelln bsic>,<neighborcelln ch>,
<neighborcelln rxl>[,<neighborcelln C1>,<neighborcelln C2>]
<CR><LF>
OK

**AT*E2EMM=7**
*E2EMM:<servcell mcc>,<servcell mnc>,<servcell lac>,
<servcell ci>,<servcell bsic>,<servcell ch>[,<servcell rxl>,
<servcell c1>,<servcell c2>][,<servcell rxlFull>,<servcell rxlSub>,
<servcell rxqfull>,<servcell rxqsub>,<servcell ta>,<servcell tn>],
<neighborcell1 mcc>,< neighborcell1 mnc>,<neighborcell1 lac>,
<neighborcell1 ci>,<neighborcell1 bsic>,<neighborcell1 ch>,
<neighborcell1 rxl>[,< neighborcell1 c1>,<neighborcell1 c2>],
<neighborcell2 mcc>,<neighborcell2 mnc>,<neighborcell2 lac>,
<neighborcell2 ci>,<neighborcell2 bsic>,<neighborcell2 ch>,
<neighborcell2 rxl>[,<neighborcell2 c1>,<neighborcell2c2>]
…
<neighborcelln mcc>,<neighborcelln mnc>,<neighborcelln lac>,
<neighborcelln ci>,<neighborcelln bsic>,<neighborcelln ch>,
<neighborcelln rxl>[,<neighborcelln c1>,<neighborcelln c2>]
OK

The mode setting <n> in the set command has the combination listed in the table below.

When <n>=5, the shot information is the same as in <n>=1, but neighbouring cells, which have to be up to 16. This is the information that comes from the Serving Cell through the BCCH, reporting the BTS that are on the Serving Cell's surroundings.

| *<n>* | *Description* |
|---|---|
| 0 | Disable network monitoring unsolicited result code. **Default value** |
| 1 | One shot presentation of the network location information. Display mode with headers and <CR><LF> line separators |
| 2 | Enable network location information unsolicited result code in Display mode (like n=1). There will be continuous unsolicited information responses <m> seconds apart |
| 3 | One shot presentation of the compact network location information |
| 4 | Enable compact network location information unsolicited result code. There will be continuous unsolicited information responses <m> seconds apart |

| <*n*> | *Description* |
|---|---|
| 5 | One shot presentation of the network location information (verbose format), including 16 BTSs, coming from the Serving Cell signalling information |
| 6 | As n=5 format but there will be continuous unsolicited information responses <m> seconds apart |
| 7 | One shot presentation of the network information (same information as in n=1) but no headers or <CR><LF> line separators. Neighbor cells from the Toplist |
| 8 | As n=7 format but there will be continuous unsolicited information responses <m> seconds apart |

| <*m*> | *Description* |
|---|---|
| 1-255 | Integer type giving time (in seconds) between unsolicited responses. **Default value is 5** |

| <*mcc*> | *Description* |
|---|---|
| Integer type | Three digits in decimal format. The Mobile Country Code identifies the PLMN serving cell country according to ITU |

| <*mnc*> | *Description* |
|---|---|
| Integer type | Two digits in decimal format. The Mobile Network Code identifies the PLMN operator in the serving cell |

| <*lac*> | *Description* |
|---|---|
| Integer type | Two byte location area code in hexadecimal format |

| <*ci*> | *Description* |
|---|---|
| Integer type | Two byte cell ID in hexadecimal format |

| <*bsic*> | *Description* |
|---|---|
| Integer type | One byte Base Stations Identification code in hexadecimal format |

| <*ch*> | *Description* |
|---|---|
| (0-1023) | It represents the ARFCN that shows the Absolute RF Channel, which identifies the BCCH carrier |

| <*rxl*> | *Description* |
|---|---|
| Integer type | Received Signal Strength level in dBm measured on idle mode |

| <*rxlfull*> | *Description* |
|---|---|
| Integer type | Received Signal Strength level in dBm. The Rx Level is taken in the Downlink and statistically is applied to 100 TDMA frames of the TCH or during a SACCH multiframe |

| <*rxlsub*> | *Description* |
|---|---|
| Integer type | Received Signal Strength level in dBm. The Rx Level is taken from the DownLink signal and the average is applied to subset of SACCH frames |

| <*rxqfull*> | *Description* |
|---|---|
| 0 | BER < 0.1% |
| 1 | 0.26% < BER < 0.30% |
| 2 | 0.51% < BER < 0.64% |
| 3 | 1.0% < BER < 1.3% |
| 4 | 1.9% < BER < 2.7% |
| 5 | 3.8% < BER < 5.4% |
| 6 | 7.6% < BER < 11.0% |
| 7 | BER > 15.0% |

| <*mcc*> | *Description* |
|---|---|
| Integer type | Three digits in decimal format. The Mobile Country Code identifies the PLMN serving cell country according to ITU |

<rxqsub> is the parameter that indicates the quality in the received signal on dedicated mode. The measurement average is applied to a subset of a SACCH multiframe.

| <*rxqsub*> | *Description* |
|---|---|
| 0 | BER < 0.1% |
| 1 | 0.26% < BER < 0.30% |
| 2 | 0.51% < BER < 0.64% |
| 3 | 1.0% < BER < 1.3% |
| 4 | 1.9% < BER < 2.7% |
| 5 | 3.8% < BER < 5.4% |
| 6 | 7.6% < BER < 11.0% |
| 7 | BER > 15.0% |

| <c1> | Description |
|---|---|
| Integer | Path Loss criterion parameter for neighbour cells. The MS calculates this parameter, in idle mode, to decide if the cell is suitable to camp on. After the calculation the criterion is C1 > 0. See GSM 05.08 |

| <c2> | Description |
|---|---|
| Integer | Cell reselection parameter for neighbour cells. This parameter shall optimise the selected cell reselection |

| <ta> | Description |
|---|---|
| 0-63 | According to GSM 04.18 V8.6.0, the coding of the timing advance value is the binary representation of the timing advance in bit periods; 1 bit period = 48/13 is. <ta> is the integer representation of the timing advance in binary format |
| 64-255 | Reserved |

| <tn> | Description |
|---|---|
| 0-7 | Its value indicates the time slot number in a traffic channel |

## 11.3 AT*E2SPN M2M Service Provider Indication

| Description | Command | Possible Responses |
|---|---|---|
| Request service provider indication | AT*E2SPN | • *E2SPN: <spi><br>• +CME ERROR: <err> |
| Show if the command is supported | AT*E2SPN=? | • OK<br>• ERROR |

Causes the MS to return the service provider name stored in the SIM card (<spi> parameter). The text will consist of a maximum of 16 bytes containing the service provider name stored in the $EF_{SPN}$ file in the SIM card (see GSM 11.11). ERROR is returned if the field is not present on the SIM.

| <spi> | Description |
|---|---|
| String | String type field of maximum length 16 bytes; character set as specified by command Select TE character set +CSCS |

## 11.4 AT*EALS Ericsson Request ALS Status

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Requests current status for ALS | AT*EALS | • *EALS: <status><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*EALS=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

Used to request the MS to give ALS (Alternate Line Services) status. The information is available on the SIM card. If ALS is active, the user has two lines for voice calls. The line number or name tag for the line is then indicated on the display.

| *<status>* | *Description* |
|---|---|
| 0 | ALS function is not active (off) |
| 1 | ALS function is active (on) |

## 11.5 AT*ECSP Ericsson Customer Service Profile

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read the customer service profile from the SIM | AT*ECSP=<service group> | • *ECSP: <service group>,<services><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*ECSP=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

This command is used to read the customer service profile (CSP) from the SIM. CSP is a list on the SIM, which indicates the services that are user accessible. Each of the services has a related bit within the CSP. The services are grouped into service groups, with a maximum of 8 services in a group. For each service group, a bit mask tells which services are available (bit=1). Unused bits are set to 0.

| *<service group>* | *Description* |
|---|---|
| Byte | Each service group has a corresponding number, service group code |

| *<services>* | *Description* |
|---|---|
| byte | Bit mask (8 bits), indicating the services within the service group<br>Bit=0: unused or unavailable service<br>Bit=1: available service |

## *11.6 AT*EPNR Ericsson Read SIM Preferred Network*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read entries in SIM preferred list | AT*EPNR=<format> [,<index1> [,<index2]] | • *EPNR: <index1>,<oper1>[...]*EPNR: <index2>, <oper2><br>• *+CME ERROR: <err>*<br>• *OK*<br>• *ERROR* |
| Test if the command is supported and list the possible settings | AT*EPNR=? | • *EPNR: (list of supported <index>s), (list of supported <format>s)<br>• *+CME ERROR: <err>*<br>• *OK*<br>• *ERROR* |

This command is used to read the SIM preferred list of networks ($EF_{PLMNSEL}$).

| *<index1>* | *Description* |
|---|---|
| integer | Start index (>0) |

| *<index2>* | *Description* |
|---|---|
| integer | Stop index (>0) |

| *<format>* | *Description* |
|---|---|
| 2 | Numeric <oper> |

| *<oper>* | *Description* |
|---|---|
| string | String indicates the code for the operator.<br>E.g. GSM - Sweden - Europolitan: "24008" (3 + 2).<br>PCS: 3 digits for country and 3 digits for network |

## *11.7 AT*EPNW Ericsson Write SIM Preferred Network*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Write/delete entries in SIM preferred list | AT*EPNW=[<index>] [,<format>,<oper>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported and list the possible settings | AT*EPNW=? | • *EPNW: (list of supported <index>s), (list of supported <format>)s<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command is used to edit the SIM preferred list of networks ($EF_{PLMNSEL}$). The entry field <oper> contains mobile country code (MCC) and mobile network code (MNC).

| *<index>* | *Description* |
|---|---|
| Integer | Index to entry in SIM preferred list.<br>The SIM preferred list contains at least 8 positions according to GSM 11.11 |

| *<format>* | *Description* |
|---|---|
| 2 | Numeric <oper> |

| *<oper>* | *Description* |
|---|---|
| String | String indicates the code for the operator.<br>E.g. GSM – Sweden - Europolitan: “24008” (3 + 2).<br>PCS: 3 digits for country and 3 digits for network |

## *11.8 AT*E2SSN Ericsson M2M SIM Serial Number*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request SIM Serial number | AT*E2SSN? | *E2ESSN: <SSN> |
| Shows if the command is supported | AT*E2SSN=? | • OK<br>• ERROR |

This command requests the SIM serial number held in the ICCid field (address 2FE2) on the SIM and returns all valid characters to the TE. This field is detailed in GSM 11.11 section 10.1.1.

| *<SSN>* | *Description* |
|---|---|
| String without double quotes | SIM serial number |

*EXAMPLES*

AT*E2SSN?
8944110063503224707
OK

where the raw data contained in the ICCid field on the SIM is 98441100360523420 7F7.

Test command:

AT*E2SSN=?
OK

## *11.9 AT*ESLN Ericsson Set Line Name*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets the line name tag in the MS | AT*ESLN=<line> [,<name>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT*ESLN? | • *ESLN: <line1>,<name1><CR><LF> *ESLN: <line2>,<name2><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported and list the possible settings | AT*ESLN=? | • *ESLN: (list of supported <line>s),<lname><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Sets the name tag for a selected line.

| *<line>* | *Description* |
|---|---|
| 0 | This means that the two lines will use the default name tags, i.e. "L1" and "L2". **Default value** |
| 1 | Line 1 |
| 2 | Line 2 |

| *<name>* | *Description* |
|---|---|
| String | Characters for name tag<br>This parameter is optional when <line> is set to 0 |

| *<lname>* | *Description* |
|---|---|
| Integer | Maximum number of characters to use in <name> string (20) |

## *11.10 AT+CIMI Subscriber Identification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read IMSI | AT+CIMI | • <IMSI><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CIMI=? | • OK<br>• ERROR |

Causes the TA to return <IMSI>, identifying the individual SIM attached to the ME.

| *<IMSI>* | *Description* |
|---|---|
| string without double quotes | International Mobile Subscriber Identity |

## *11.11 AT+CLCK Facility Lock*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request facility lock | AT+CLCK=<fac>, <mode>[,<passwd> [,<class>]] | • when <mode>=2 and command successful: +CLCK: <status>[,<class1> [<CR><LF>+CLCK: <status>,<class2>[...]]<br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CLCK=? | • +CLCK: (list of supported <fac>s)<br>• +CME ERROR <err><br>• OK |

The command is used to lock, unlock or interrogate an ME or a network facility <fac>. A password is normally needed to carry out such actions.

Call barring facilities are based on GSM supplementary services (refer to GSM 02.88). The interaction of these, with other commands based on other GSM supplementary services, is described in the GSM standard.

| *<fac>* | *Description* |
|---|---|
| “CS” | CNTRL (lock CoNTRoL surface (e.g. phone keyboard)) |
| “PS” | PH-SIM (lock PHone to SIM card) (ME asks password when other than current SIM card inserted) |
| “SC” | SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued) |
| “FD” | SIM fixed dialling feature. PIN2 is required as a password |
| “P2” | SIM PIN2 |

| *<fac>* | *Description* |
|---|---|
| "AO" | BAOC (bar all outgoing calls) |
| "OI" | BOIC (bar outgoing international calls) |
| "AI" | BAIC (bar all incoming calls) |
| "IR" | BIC-Roam (bar incoming calls when roaming outside the home country) |
| "OX" | BOIC-exHC (bar outgoing international calls except to home country) |
| "AB" | All barring services |
| "AG" | All out going barring services |
| "AC" | All in coming barring services |
| "PN" | Network personalization |
| "PU" | Network subset personalization |
| "PP" | Service provider personalization |
| "PC" | Corporate personalization |

| *<mode>* | *Description* |
|---|---|
| 0 | Unlock |
| 1 | Lock |
| 2 | Query status |
| 10 | Full lock (only valid for <fac>="PS", after power on always ask for password) |

| *<status>* | *Description* |
|---|---|
| 0 | Not active |
| 1 | Active |

| *<passw>* | *Description* |
|---|---|
| string type | Is the same as password specified for the facility from the ME user interface or with change password command, +CPWD |

| *<classx>* | *Description* |
|---|---|
| 1 | Voice L1 |
| 2 | Data |
| 4 | Fax |
| 8 | Short message service |
| 16 | Data circuit sync |

| <*classx*> | *Description* |
|---|---|
| 32 | Data circuit async |
| 64 | Dedicated packet access |
| 128 | Voice L2 |
| 1..30 | When “no reply” is enabled or queried, this gives the time in seconds to wait before the call is forwarded. **Default value is 20** |

## *11.12 AT+CNUM Subscriber Number*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request subscriber number | AT+CNUM | • +CNUM: [<alpha1>],<number1>,<type1> [,<speed>,<service>[,<itc>]][<CR><LF >+CNUM: [<alpha2>],<number2>,<type2> [,<speed>,<service> [,<itc>]][…]]<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CNUM=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

This command returns the MSISDNs related to the subscriber (this information can be stored in the SIM or in the ME). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

| <*alphax*> | *Description* |
|---|---|
| Alphanumeric string | Associated with <number*x*>; used character set should be the one selected with the Select TE character set command, +CSCS |

| <*numberx*> | *Description* |
|---|---|
| String type | Phone number of format specified by <type*x*> |

| <*typex*> | *Description* |
|---|---|
| Integer format | Type of address, (refer to GSM 04.08 subclause 10.5.4.7) |

| <*speed*> | *Description* |
|---|---|
| data rate | As defined in subclause 6.7 GSM 07.07 |

| <service> | Description |
|---|---|
| 0 | Asynchronous modem |
| 4 | Voice |
| 5 | Fax |

| <itc> | Description |
|---|---|
| 0 | 3.1kHz |
| 1 | UDI |

## 11.13 AT+COLP Connected Line Identification Presentation

| Description | Command | Possible Responses |
|---|---|---|
| Request connected line identification presentation | AT+COLP=[<n>] | • OK<br>• ERROR |
| Show the current setting | AT+COLP? | • +COLP: <n>,<m><br>• OK<br>• ERROR |
| Show if the command is supported | AT+COLP=? | • +COLP: (list of supported <n>s)<br>• OK<br>• ERROR |

This command refers to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.

When enabled (and allowed by the called subscriber), +COLP: <number>,<type>[,<subaddr>,<satype> [,<alpha>]] intermediate result code is returned from the TA to the TE before any +CR or V.25ter responses. It is manufacturer specific if this response is used when normal voice call is established.

Read command gives the status of <n>, and also triggers an interrogation of the provision status of the COLP service according 3GPP TS 22.081 (given in <m>).

Test command returns values supported by the TA as a compound value.

| <n> | Description |
|---|---|
| 0 | Disable |
| 1 | Enable |

| <*m*> | *Description* |
|---|---|
| 0 | COLP not provisioned |
| 1 | COLP provisioned |
| 2 | unknown (e.g. no network, etc.) |

Intermediate Result codes:

+COLP: <number>,<type>[,<subaddr>,<satype> [,<alpha>]]

## *11.14 AT+COPS Operator Selection*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request operator selection | AT+COPS=[<mode> [,<format> [,<oper>]]] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Shows the current setting | AT+COPS? | • +COPS: <mode>[,<format>, <oper>]<br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+COPS=? | • +COPS: list of supported (<stat>,long alphanumeric <oper>, short alphanumeric <oper>,numeric <oper>)s<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Forces an attempt to select and register the GSM network operator.

| <*mode*> | *Description* |
|---|---|
| 0 | Automatic (<oper> field is ignored) |
| 1 | Manual (<oper> field present) |
| 3 | Set only <format> (for read command +COPS?), do not attempt registration/de-registration (<oper> field is ignored); this value is not applicable in read command response |
| 4 | Manual/automatic (<oper> field present); if manual selection fails, automatic mode (<mode>=0) is entered |

| <*format*> | *Description* |
|---|---|
| 0 | Automatic (<oper> field is ignored) |
| 1 | Short format alphanumeric <oper> |
| 2 | Numeric <oper> |

| *<oper>* | *Description* |
|---|---|
| string type | Format determined by the <format> setting |

| *<stat>* | *Description* |
|---|---|
| 0 | Unknown |
| 1 | Available |
| 2 | Current |
| 3 | Forbidden |

## *11.15 AT+CREG Network Registration*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request network registration | AT+CREG=[<n>] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Show the current setting | AT+CREG? | • +CREG: <n>,<stat><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CREG=? | • +CREG: (list of supported <n>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Set command controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the ME network registration status.

Read command returns the status of result code presentation and an integer <stat>, which shows whether the network has currently indicated the registration of the ME.

Controls the presentation of the unsolicited result code +CREG.

| *<n>* | *Description* |
|---|---|
| 0 | Disable network registration unsolicited result code. **Default value** |
| 1 | Enable network registration unsolicited result code |

| <*stat*> | *Description* |
|---|---|
| 0 | Not registered, ME is not currently searching for a new operator to register with |
| 1 | Registered, home network |
| 2 | Not registered, but ME is currently searching for a new operator to register with |
| 3 | Registration denied |
| 4 | Unknown |
| 5 | Registered, roaming |

## *11.16 AT*ECPI Ciphering Indicator*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request activation of the ciphering indication | AT*ECPI=<switch> | • OK<br>• +CME: <error><br>• ERROR |
| Shows the current setting | AT*ECPI? | • *ECPI: <switch><br>• OK<br>• ERROR |
| Show if the command is supported | AT*ECPI=? | • *ECPI: (list of supported <switch>es values)<br>• OK<br>• ERROR |

This command allows the external application to activate/deactivate the ciphering indication. The ciphering indication allows the external application to detect when the mobile connection becomes deciphered and thus unsecured.

Test command gives the current value of the <switch> parameter, informing if the indicator is enabled or disabled.

The ciphering indicator feature may be disabled by the home network operator setting data in the “administrative data” field (EFAD) in the SIM as defined in GSM 11.11.

If this feature is not disabled by the SIM, then whenever a connection is in place, which is or becomes deciphered, an indication is given via the unsolicited result code *ECPV:<ciphering>.

| <*switch*> | *Description* |
|---|---|
| 1 | Ciphering indication is on. The unsolicited result code *ECPV is sent anytime the communication is unsecured and when it becomes secure again |
| 0 | Ciphering indication is off. Disable the ciphering indication, *ECPV is not sent |

Unsolicited Result Codes:

*ECPV: <ciphering>. Sent only when <switch> is set to 0.

Unsolicited Result Codes

*ECPV - Ciphering Indicator

SYNTAX - Unsolicited Result code

| *Description* | *Response* | *When* |
|---|---|---|
| Set command informs the TE when a communication is unsecured due to the fact that the network is not enciphering the communication | *ECPV: <ciphering> | When AT*ECPI enables it, the *ECPV:<ciphering> is sent during a connection whenever the communication is not enciphered. If a connection becomes secure after that, the *ECPV:<ciphering> is sent again to indicate that now the communication is enciphered |

| *<ciphering>* | *Description* |
|---|---|
| 0 | The connection is secured. The network enciphers the communication |
| 1 | The connection is unsecured. The network does not encipher the communication |

## *11.17 AT*E2NBTS Ericsson M2M Neighbour BTS*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Neighbour Cells to monitor | AT*E2NBTS=<ch1>,<bsic1>[,<ch2>,<bsic2>[,<ch3>,<bsic3>[,<ch4>,<bsic4>[,<ch5>,<bsic5>[,<ch6>,<bsic6>[,<ch7>,<bsic7>[,<ch8>,<bsic8>[,<ch9>,<bsic9>[,<ch10>,<bsic10>[,<ch11>,<bsic11>[,<ch12>,<bsic12>[,<ch13>,<bsic13>[,<ch14>,<bsic14>[,<ch15>,<bsic15>[,<ch16>,<bsic16>]]]]]]]]]]]]]]]] | • ERROR<br>• OK |
| Read the monitored neighbour cells | AT*E2NBTS? | • *E2NBTS: <mcc>,<mnc>,<ci>,<bsic>,<ch>,<rxl><CR><LF><br><mcc>,<mnc>,<ci>,<bsic>,<ch>,<rxl><CR><LF><br>…<br><mcc>,<mnc>,<ci>,<bsic>,<ch>,<rxl><CR><LF><br><CR><LF><br>• OK<br>• ERROR |
| Show if the command is supported | AT*E2NBTS=? | • *E2NBTS: (list of supported <ch>s)<br>• ERROR |

The set command shall provide with the ARFCNs (<ch>) and the BSIC (the BSIC is a cell colour code) to the MS in order to monitor those channels, belonging to the neighbour cells, instead of the ones that come through the air interface, in the serving cell information broadcast channel.

It is possible to update that information with up to 16 neighbour cells. If less than 16 <ch>s are provided, then the assigned channels shall substitute the last previous channel (given either by the BCCH or by another AT*E2NBTS command), if it is not in the list yet. Therefore, <ch1>,<bsic1> will substitute BTS 16 in the MS, <ch2>,<bsic2> to the BTS 15 and so on. If any of the <ch>s is already in the top-list, then it is skipped.

The read command displays the data of every neighbour cell, including the following parameters: MCC, MNC, Cell ID, BSIC, Channel and Rx Level.

| *<ch>* | *Description* |
|---|---|
| (0-1023) | It represents the ARFCN that shows the Absolute RF Channel, which identifies a BCCH carrier |

| *<mcc>* | *Description* |
|---|---|
| String Type | Three digits in decimal format. The Mobile Country Code identifies the PLMN serving cell country according to ITU |

| *<mnc>* | *Description* |
|---|---|
| String Type | Two digits in decimal format. The Mobile Network Code identifies the PLMN operator in the serving cell |

| *<ci>* | *Description* |
|---|---|
| String type | Two byte cell ID in hexadecimal format |

| *<bsic>* | *Description* |
|---|---|
| String Type | One byte Base Stations Identification code in hexadecimal format |

| *<rxl>* | *Description* |
|---|---|
| String Type | Received Signal Strength level in dBm, measured in idle mode |

# 12. Phonebook

## *12.1 AT*E2PBCS Ericsson M2M Phonebook Check Sum*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request phone book checksum | AT*E2PBCS | • *E2PBCS: <cks><br>• +CME ERROR: <err> |
| Show if the command is supported | AT*E2PBCS=? | • OK<br>• ERROR |

Command causes the ME to return the phone book checksum <cks> stored internally . Phone book checksum is recalculated whenever there is a change in the phone book. By requesting the checksum, the external application can detect if the phone book in the ME has changed, without downloading the whole phone book.

During the SIM initialisation process, it takes some time to download the phone book from the SIM card to the ME, depending on the number of entries. In case the command is invoked before the checksum has been calculated, the ME gives an ERROR message.

| *<cks>* | *Description* |
|---|---|
| Hex type | 1 byte in hexadecimal (between “”), containing the checksum |

## *12.2 AT*ESAG Ericsson Add to Group*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Adds a new item to the group with <gindex> | AT*ESAG=<gindex>, <type>, <itemindex> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported and list the possible settings | AT*ESAG=? | • *ESAG: (list of supported <gindex>s, list of supported <type>s<br>• OK<br>• ERROR |

This command adds a contact or a phone number to the current group.

| *<gindex>* | *Description* |
|---|---|
| 1-10 | The group index within the hierarchical phone book |

| *<type>* | *Description* |
|---|---|
| 1 | Contact |
| 2 | Phone number |

| *<itemindex>* | *Description* |
|---|---|
| Integer | The index of the contact/group/phone number to add. The <itemindex> parameter has the following meaning: if the item to add is a contact, the <itemindex> is the index of the contact in the contacts book. If the item to add is a phone number the <itemindex> is the index in the phone book |

## *12.3 AT*ESCG Ericsson Create Group*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Adds a new group to the hierarchical phone book | AT*ESCG=<name> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Shows if the command is supported | AT*ESCG=? | • *ESCG: <maxnamelength><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command creates a new group in the hierarchical phone book. The group is stored at the first available position. There are 10 group positions in the hierarchical phone book.

| *<name>* | *Description* |
|---|---|
| String | The group name. Character set as specified by command Select TE Character Set (AT+CSCS) |

| *<maxnamelength>* | *Description* |
|---|---|
| integer | The maximum length of the grouping (bytes) |

## *12.4 AT*ESCN Ericsson Set Credit Card Number*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set up a credit card number | AT*ESCN=<mode> [,<passwd>][,<indexn>] [,<asn>,<type>,<name>,<vercode>[,<send order>]] | • +CME ERROR: <err> when mode=3:*ESCN: <indexn>,<asn>,<type>, <name>,<vercode>, <send order> When mode=4:*ESCN: <selindexn><br>• OK<br>• ERROR |
| Test if the command is supported | AT*ESCN=? | • *ESCN: (list of supported <index>s),(list of supported <mode>s),(list of supported <send order>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Command is used to:

- set up a credit card number in the ME.
- disable credit card calls.
- enable one of the credit card call services.
- query the settings for one of the services.
- query the active credit call access server.

| *<mode>* | *Description* |
|---|---|
| 0 | Settings for a credit card call (<passwd>, <indexn>, <asn>,<type>,<name>,<vercode> [,<send order>]). The four (4) parameters (<passwd>, <indexn>, <asn>, <vercode>) are mandatory when <mode>=0. If all those are not submitted ERROR will be returned |
| 1 | Disable credit card calling (<passwd>). If any other parameters are submitted, they are ignored |
| 2 | Enable one of the credit card call services (<passwd>, <indexn>). If any other parameters are submitted, they are ignored |
| 3 | Query (<passwd>, <indexn>). If any other parameters are submitted, they are ignored |
| 4 | Query for the selected credit call access server. If any parameters are submitted, they are ignored |

| *<passwd>* | *Description* |
|---|---|
| String | character string, phone lock code “PS”, PH-SIM |

| *<indexn>* | *Description* |
|---|---|
| 1 | Index number to the first credit card call access server |
| 2 | Index number to the second credit card call access server |

| <*selindexn*> | *Description* |
|---|---|
| 0 | Credit card calling disabled |
| 1 | Index number to the first credit card call access server |
| 2 | Index number to the second credit card call access server |

| <*asn*> | *Description* |
|---|---|
| String | Character string <0..9,+>, max. 20 characters Phone number of format specified by <type*x*> |

| <*type*> | *Description* |
|---|---|
| Integer format | Type of address |

| <*name*> | *Description* |
|---|---|
| String | Character string of the name tag, for M&M. Maximum of 18 characters |

| <*vercode*> | *Description* |
|---|---|
| String | Character string <0..9,#,*>. Maximum of 20 characters |

| <*send order*> | *Description* |
|---|---|
| 1 | Verification code first. **Default value** |
| 2 | phone number to call first |

## *12.5 AT*ESDG Ericsson Delete Group*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Deletes a group defined in the hierarchical phone book | AT*ESDG=<gindex> | • +CME ERROR: <err><br>• OK |
| Show if the command is supported and list the possible <gindex> | AT*ESDG=? | • *ESDG: list of <gindex>s<br>• OK |

This command deletes the group at position <gindex> from the hierarchical phone book.

| <*gindex*> | *Description* |
|---|---|
| 1-10 | The group index |

## 12.6 AT*ESDI Ericsson Delete Group Item

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Deletes the item in group <gindex> with position <index> | AT*ESDI=<gindex>,<index> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT*ESDI=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

The command deletes the item with <index> in the group with <gindex>.

| *<gindex>* | *Description* |
|---|---|
| 1-10 | The groups index within the hierarchical phone book |

| *<index>* | *Description* |
|---|---|
| 1-15 | The items index within the group |

## 12.7 AT*ESGR Ericsson Group Read

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Lists the groups defined in the hierarchical phone book | AT*ESGR | • *ESGR: <gindex1>, <name1>[<CR><LF> <gindex2>, <name2>..]<br>• OK<br>• ERROR |
| Shows if the command is supported | AT*ESGR=? | OK |

This command lists the groups in the hierarchical phone book.

| *<gindex>* | *Description* |
|---|---|
| 1-10 | The group index |

| *<name>* | *Description* |
|---|---|
| String | The group name |

## *12.8 AT*EGIR Ericsson Group Item Read*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Lists the items in the <gindex> group | AT*EGIR=<gindex> | • *EGIR: <index1>, <type1>,<itemindex> [<CF><LF><index2>, <type2>, <itemindex> [...]]<br>• OK<br>• ERROR |
| Show if the command is supported | AT*EGIR=? | • OK<br>• ERROR |

This command lists the items stored in the group identified by <gindex>.

| *<gindex>* | *Description* |
|---|---|
| 1-10 | The groups index within the hierarchical phonebook |

| *<index>* | *Description* |
|---|---|
| 1-15 | The items index within the group |

| *<type>* | *Description* |
|---|---|
| Integer | The kind of item. See AT*ESAG <item> table for definition |

| *<itemindex>* | *Description* |
|---|---|
| Integer | The item's index within the phonebook/contacts/group |

## *12.9 AT*ESNU Ericsson Settings Number*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets a number in the MS | AT*ESNU=<type>, <number>[,<number type>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported and show possible settings | AT*ESNU=? | • *ESNU: (list of supported <type>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT*ESNU? | • *ESNU: <type 1>, <number 1>, <number type 1> <CR><LF> ….*ESNU: <type n>, <number n>, <number type n><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command sets a <type> number, in the format <number type>, in the MS.

| *<type>* | *Description* |
|---|---|
| 0 | Voice L1 |
| 1 | Voice L2 |
| 2 | Fax |
| 3 | Data |

| *<number type>* | *Description* |
|---|---|
| 129 | Default value when dialling string does not include the international access code character ‘+’ |
| 145 | Default value when dialling string includes the international access code character ‘+’ |

| *<number>* | *Description* |
|---|---|
| 0-9, + | Number |

## *12.10 AT+CPBF Phonebook Find*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Shows the current setting | +CPBF=<findtext> | • +CPBF: <index1>,<number>,<type>,<text>[[...]<CR><LF>+CBPF: <index2>,<number>,<type>,<text>]<br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | +CPBF=? | • +CPBF: <nlength>,<tlength><br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Returns phone book entries whose alphanumeric field starts with <findtext>. Only currently selected source will be searched for,

| *<findtext>* | *Description* |
|---|---|
| string type | Field of maximum length <tlength>; character set as specified by the select TE character set command, +CSCS |

## *12.11 AT+CPBR Phonebook Read*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read phone book entries | +CPBR=<index1> [,<index2>] | • +CPBR:<index1>,<number>, <type>,<text>[[,<text_date>, <text_time>]<CR><LF>+CPBR: <index2>,<number>,<type>, <text>[,<text_date>, <text_time>]]<br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | +CPBR=? | • +CPBR: (list of supported <index>s),<nlength>,<tlength><br>• +CME ERROR <err><br>• OK<br>• ERROR |

Returns phone book entries in location number range <index1>... <index2> from the current phone book memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. Entry fields returned are location number <indexn>, phone number stored there <number> (of format <type>) and text <text> associated with the number.

| *<indexn>* | *Description* |
|---|---|
| integer type | Values in the range of location numbers of phone book memory |

| <*number*> | *Description* |
|---|---|
| string type | Phone number of format <type> |

| <*type*> | *Description* |
|---|---|
| 129 | ISDN/telephony numbering plan, national/international unknown |
| 145 | ISDN/telephony numbering plan, international number |
| 161 | ISDN/telephony numbering plan, national number |
| 128 - 255 | Other values refer to GSM 04.08 section 10.5.4.7 |

| <*text*> | *Description* |
|---|---|
| string type | Field of maximum length <tlength>;<br>character set as specified by the select TE character set command, +CSCS. |

| <*nlength*> | *Description* |
|---|---|
| integer type | Value indicating the maximum length of field <number> |

| <*tlength*> | *Description* |
|---|---|
| integer type | Value indicating the maximum length of field <text> |

## *12.12 AT+CPBS Phone Storage*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set phone book storage | AT+CPBS=<storage> [,<password>] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Read the current setting | AT+CPBS? | • +CPBS: <storage><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CPBS=? | • +CPBS: (list of supported <storage>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

Selects phone book memory storage <storage>, which is used by other phone book commands. Read command returns currently selected memory, and when supported by manufacturer, number of used locations and total number of locations in the memory.

| *<storage>* | *Description* |
|---|---|
| "FD" | Fixed dialled numbers |
| "EN" | Emergency numbers |
| "ME" | ME phone book |
| "SM" | SIM phone book |
| "DC" | ME dialled calls list (30 entries) |
| "RC" | ME received calls list (30 entries) |
| "MC" | ME missed calls list (30 entries) |

| *<passwd>* | *Description* |
|---|---|
| String type | Represents the password required when selecting password protected <storage>s, for example PIN2 for storage "ME" |

## *12.13 AT+CPBW Phonebook Write*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request phone book write | AT+CPBW=[<index>] [, <number>[,<type> [,<text>]]] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CPBW=? | • +CPBW: (list of supported <index>s),<nlength>,(list of supported <type>s),<tlength><br>• +CME ERROR <err><br>• OK<br>• ERROR |

Writes phone book entry in location number <index> in the current phone book memory storage area, selected with AT+CPBS. If the <number> and <text> parameters are omitted, the entry is deleted. If <index> is omitted but <number> is included, the entry is written to the first free location in the phone book.

| *<index>* | *Description* |
|---|---|
| integer type | Values in the range of location numbers of phone book memory |

| *<number>* | *Description* |
|---|---|
| string type | Phone number of format <type> |

| *<type>* | *Description* |
|---|---|
| integer format | Type of address octet, default 145 when dialing string includes international access code character "+", otherwise 129. (refer to GSM 04.08 subclause 10.5.4.7) |
| 129 | ISDN/telephony numbering plan, national/international unknown |
| 145 | ISDN/telephony numbering plan, international number |
| 161 | ISDN/telephony numbering plan, national number |
| 128-255 | Other values refer GSM 04.08 section 10.5.4.7 |

| *<text>* | *Description* |
|---|---|
| string type | Field of maximum length <tlength>;<br>character set as specified by the select TE character set command, +CSCS |

| *<nlength>* | *Description* |
|---|---|
| integer type | Value indicating the maximum length of field <number> |

| *<tlength>* | *Description* |
|---|---|
| integer type | Value indicating the maximum length of field <text> |

# 13. Short Message Services - Point to Point

## *13.1 AT+CPIN PIN Control*

See 3.23, AT+CPIN PIN Control

## *13.2 AT+CGSMS Select Service for MO SMS Messages*

See 6.10, AT+CGSMS Select Service for MO SMS Messages

## *13.3 AT+CPMS Preferred Message Storage*

*Common for both PDU (Protocol Data Unit) and Text Modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set preferred message storage | AT+CPMS=<mem1> [,<mem2>] [,<mem3>] | • +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3><br>• *+CMS ERROR: <err>*<br>• OK<br>• ERROR |
| Read the command | AT+CPMS? | • +CPMS: <mem1>,<used1>,<total1>, <mem2>,<used2>,<total2>, <mem3>,<used3>,<total3><br>• *+CMS ERROR: <err>*<br>• OK<br>• ERROR |
| Show if the command is supported | AT+CPMS=? | • +CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s)<br>• OK<br>• ERROR |

Selects memory storage <mem1>, <mem2> and <mem3> to be used for reading, writing, etc. If chosen storage is not appropriate for the ME (but is supported by the TA), final result code +CMS ERROR: <err> is returned.

Test command returns lists of memory storage supported by the TA.

| *<mem1>* | *Description* |
|---|---|
| string type | Memory from which messages are read and deleted (commands List Messages +CMGL, Read Message +CMGR and Delete Message +CMGD) |
| "ME" | ME message storage |
| "SM" | SIM message storage. **Default value** |

| *<mem2>* | *Description* |
|---|---|
| string type | Memory to which writing and sending operations are made (commands Send Message from Storage +CMSS and Write Message to Memory +CMGW) |
| "ME" | ME message storage |
| "SM" | SIM message storage |

| *<mem3>* | *Description* |
|---|---|
| string type | Memory to which received SMs are preferred to be stored (unless forwarded directly to TE). Received CBMs are always stored in "BM" (or some manufacturer specific storage) unless directly forwarded to TE |
| "ME" | ME message storage |
| "SM" | SIM message storage |

| *<used1>,<used2>,<used3>* | *Description* |
|---|---|
| integer type | Total number of messages currently in <mem1>, <mem2> and <mem3> respectively |

| *<total1>,<total2> ,<total3>* | *Description* |
|---|---|
| integer type | Total number of message locations in <mem1>, <mem2> and <mem3> respectively |

## *13.4 AT+CSCA Service Centre Address*

*Common for both PDU and Text Modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set service centre address | AT+CSCA=<sca> [,<tosca>] | • OK<br>• ERROR |
| Show the current setting | AT+CSCA? | • +CSCA: <sca>,<tosca><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CSCA=? | • OK<br>• ERROR |

Updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, the setting is used by send (+CMGS) and write (+CMGW) commands. In PDU mode, the setting is used by the same commands, but only when the length of the SMSC address coded into <pdu> parameter equals zero. Note that a "+" in front of the number in <sca> has precedence over the <tosca> parameter, so that a number starting with "+" will always be treated as an international number.

| *<sca>* | *Description* |
|---|---|
| string type | GSM 04.11 (3G TS 24.011) RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set |

| *<tosca>* | *Description* |
|---|---|
| integer type | GSM 04.11 (3G TS 24.011) RP SC address type-of-address octet in integer format |
| 129 | ISDN/telephony numbering plan, national/international unknown |
| 145 | ISDN/telephony numbering plan, international number |
| 161 | ISDN/telephony numbering plan, national number |
| 128-255 | Other values refer GSM 04.08 section 10.5.4.7 |

## *13.5 AT+CMGF Message Format*

*Common for both PDU and Text Modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set message format | AT+CMGF=<mode> | • OK<br>• ERROR |
| Read the current setting | AT+CMGF? | • +CMGF: <mode><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGF=? | • +CMGF: (list of supported <mode>s)<br>• OK<br>• ERROR |

This command tells the TA, which input and output format to use for messages. The <mode> parameter indicates the format of messages used with send, list, read and write commands, and unsolicited result codes resulting from received messages. Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters).

Test command returns supported modes as a compound value.

| *<mode>* | *Description* |
|---|---|
| 0 | PDU mode |
| 1 | Text mode |

## *13.6 AT+CMGW Write Message to Memory*

*PDU Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Write message to memory | AT+CMGW=<length> [,<stat>]<CR><br>***PDU is given***<ctrl-Z/ESC> | • +CMGW: <index><br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGW=? | • OK<br>• ERROR |

Stores a message to memory storage <mem2>. Memory location <index> of the stored message is returned. By default message status will be set to 'stored unsent', but parameter <stat> allows other status values to be given. ME/TA manufacturer may choose to use different default <stat> values for different message types. Entering PDU is the

same as specified by the send message command, +CMGS. If writing fails, final result code +CMS ERROR: <err> is returned. See “AT+CPMS Preferred Message Storage”, page 179.

| <*stat*> | *Description* |
|---|---|
| 2 | Stored unsent message (only applicable to SMs) |

| <*index*> | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

| <*length*> | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| <*pdu*> | *Description* |
|---|---|
| ... | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))<br>In the case of CBS: GSM 03.41 TPDU in hexadecimal format |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Write message to memory | AT+CMGW [=<oa/da> [,<tooa/toda>[,<stat>]]] <CR><br>***Text is entered*** <ctrl-Z/ESC> | • +CMGW: <index><br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGW=? | • OK<br>• ERROR |

Stores message (either SMS-DELIVER or SMS-SUBMIT) to memory storage <mem2>. Memory location <index> of the stored message is returned. By default message status will be set to ‘stored unsent’, but parameter <stat> allows also other status values to be given. The entering of text is done as specified in the send message command, +CMGS. If writing fails, final result code +CMS ERROR: <err> is returned.

***Note!*** SMS-COMMANDs and SMS-STATUS-REPORTs cannot be stored in text mode.

| <*stat*> | *Description* |
|---|---|
| 2 | Stored unsent message (only applicable to SMs) |

| *<oa>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Originating-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <tooa> |

| *<da>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <toda> |

| *<tooa>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>) |

| *<toda>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

## *13.7 AT+CMGS Send Message*

*PDU Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send message | AT+CMGS=<length><br><CR><br>***PDU is given***<ctrl-Z/ESC> | • +CMGS: <mr>[,<ackpdu>]<br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGS=? | • OK<br>• ERROR |

Sends a message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Optionally, when AT+CSMS <service> value is 1 and there is network support, <ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable.

- <length> must indicate the number of octets coded in the TP layer data unit to be given (i.e. SMSC address octets are excluded).
- The TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that PDU can be given from TE to ME/TA.
- The DCD signal is in the ON state as PDU is given.
- The echoing of given characters back from the TA is controlled by V.25ter echo command E.
- The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU.
- When the length octet of the SMSC address (given in the <pdu>) equals zero, the SMSC address set with command Service Centre Address +CSCA is used.
- Sending can be cancelled by giving <ESC> character (IRA 27).
- <ctrl-Z> (IRA 26) must be used to indicate the ending of PDU.

| *<mr>* | *Description* |
|---|---|
| Integer type | GSM 03.40 TP-Message-Reference in integer format |

| *<length>* | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| *<ackpdu>* | *Description* |
|---|---|
| ... | GSM 03.40 RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without GSM 04.11 SC address field and parameter shall be bounded by double quote characters like a normal string type parameter |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send message | AT+CMGS=<da>[,<toda>]<CR><br>***Text is entered***<ctrl-Z/ESC> | • +CMGS: <mr>[,<scts>]<br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGS=? | • OK<br>• ERROR |

Sends a message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Optionally, when AT+CSMS <service> value is 1 and there is

network support, <scts> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable.

- The entered text (GSM 03.40 TP-Data-Unit) is sent to address <da> and all current settings (refer Set Text Mode Parameters +CSMP and Service Centre Address +CSCA) are used to construct the actual PDU in the ME/TA.
- The TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after the command line is terminated with <CR>; after that text can be entered from the TE to the ME/TA.
- The DCD signal is in the ON state as text is entered.
- The echoing of entered characters back from the TA is controlled by V.25ter echo command E.
- The entered text should be formatted as follows:

  if <dcs> (set with +CSMP) indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set:

  if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in TS 07.07): ME/TA converts the entered text into GSM alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);

  if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts to 7-bit characters of GSM alphabet (e.g. 17 (IRA 49 and 55) will be converted to character Π (GSM 23));

  if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42).
- Sending can be cancelled by giving <ESC> character (IRA 27).

- <ctrl-Z> (IRA 26) must be used to indicate the ending of the message body.

| *<da>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <toda> |

| *<toda>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| *<mr>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>) |

| *<mr>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Message-Reference |

*Example*

```
AT+CMGF=1
OK
AT+CSDH=1
OK
AT+CSMP=17,167,0,0
OK
AT+CMGS="+447747008670"
> Test SMS
+CMGS: 15

OK
```

## *13.8 AT+CMSS Send From Storage*

*PDU mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send from storage | AT+CMSS=<index> | • +CMSS: <mr><br>• *+CMS ERROR: <err>*<br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMSS=? | • OK<br>• ERROR |

Sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). Reference value <mr> is returned to the TE on successful message delivery. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable. See "AT+CPMS Preferred Message Storage", page 179.

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

| *<mr>* | *Description* |
|---|---|
| Integer type | GSM 03.40 TP-Message-Reference in integer format |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send from storage | AT+CMSS=<index> [,<da> [,<toda>]] | • +CMSS: <mr> [,<scts>]<br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMSS=? | • OK<br>• ERROR |

Sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). Reference value <mr> is returned to the TE on successful message delivery. Optionally, when +CSMS <service> value is 1 and network

supports, <scts> is returned. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable.

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

| *<da>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <toda> |

| *<toda>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| *<scts>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>) |

| *<mr>* | *Description* |
|---|---|
| Integer type | GSM 03.40 TP-Message-Reference in integer format |

## *13.9 AT+CMGC Send Command*

*PDU Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send command message | AT+CMGC=<length><CR><br><pdu><ctrl-Z/ESC> | • if PDU mode (+CMGF=0) and sending successful: +CMGC: <mr>[,<ackpdu>]<br>• if sending fails: +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGC=? | • OK<br>• ERROR |

Sends a command message from a TE to the network (SMS-COMMAND). The entering of PDU is as specified in the send message command, +CMGS. Message reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <ackpdu> is returned.

Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable.

| *<length>* | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| *<pdu>* | *Description* |
|---|---|
| String | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))<br>In the case of CBS: GSM 03.41 TPDU in hexadecimal format |

| *<mr>* | *Description* |
|---|---|
| Integer type | GSM 03.40 TP-Message-Reference in integer format |

| *<ackpdu>* | *Description* |
|---|---|
| String | GSM 03.40 RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without GSM 04.11 SC address field and parameter shall be bounded by double quote characters like a normal string type parameter |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send command message | AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]] <CR><br>***Text is entered***<ctrl-Z/ESC> | • if PDU mode (+CMGF=1) and sending successful: +CMGC: <mr>[,<scts>]<br>• if sending fails: +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the commands is supported | AT+CMGC=? | • OK<br>• ERROR |

Sends a command message from a TE to the network (SMS-COMMAND). The entering of text is as specified in the send message command, +CMGS, but the format is fixed to be a sequence of two IRA character long hexadecimal numbers, which the ME/TA converts into 8-bit octets (refer to +CMGS). Message reference value <mr> is returned to the TE on successful message delivery. Optionally, when +CSMS <service> value is 1 and there is network support, <scts> is returned. Values can be used to identify message upon unsolicited

delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. This command is abortable.

| <*fo*> | *Description* |
|---|---|
| 0 | First octet of SMS-DELIVER in integer format |
| 1 | First octet of SMS_SUBMIT in integer format |
| 2 | First octet of SMS-STATUS-REPORT in integer format |
| 3 | First octet of SMS-COMMAND in integer format |

| <*ct*> | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Command-Type. **Default value is 0** |

| <*pid*> | *Description* |
|---|---|
| 0-255 | Protocol Identifier in integer format. **Default value is 0**, according to 07.05 section 9.2.3.9 |

| <*mn*> | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Message-Number |

| <*da*> | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command `+CSCS`). Type of address given by `<toda>` |

| <*toda*> | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| <*mr*> | *Description* |
|---|---|
| Integer type | GSM 03.40 TP-Message-Reference in integer format |

| <*scts*> | *Description* |
|---|---|
| String type | GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer to <dt>) |

## *13.10 AT+CNMI New Message Indications to TE*

*PDU Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set new message indication to TE | AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>]]]] | • +CMS ERROR: <err><br>• OK<br>• ERROR |
| Shows the current setting | AT+CNMI? | • +CNMI: <mode>,<mt>,<bm>,<ds><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CNMI=? | • +CNMI: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>s)<br>• OK<br>• ERROR |

Selects the procedure for the way in which new messages received from the network, are indicated to the TE when it is active, e.g. DTR signal is ON. If the TE is inactive (DTR signal is OFF), message receiving is carried out as specified in GSM 03.38 (3G TS 23.038).

If the command fails and the error is related to mobile equipment or network, the final result code CMS ERROR: <err> is returned.

| *<mode>* | *Description* |
|---|---|
| 3 | Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode |

| *<mt>* | *Description* |
|---|---|
| 0 | No SMS-DELIVER indications are routed to the TE.<br>No class, Class 0, class 1 and class 3 use <mem3> as preferred storage. Class 2 messages shall be stored in the SIM. If it this is not possible then the MS shall send an error message accordingly to GSM 03.38 |
| 1 | SMS-DELIVER is stored into ME/TA and the indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> |
| 2 | Class 0, class 1, and class 3 SMS-DELIVERs are routed directly to the TE using the unsolicited result code but not stored in ME/TA: +CMT:[<alpha >], <length><CR><LF><pdu> (PDU mode enabled) Class 2 data coding scheme result in indication as defined in <mt>=1 |
| 3 | Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes +CMT: <length><CR><LF><pdu>. Class 3 SMS-DELIVER is not stored in ME/TA. Messages of other data coding schemes result in indication as defined in <mt>=1 |

| *<bm>* | *Description* |
|---|---|
| 0 | Store message to “BM” (or some manufacturer specific memory). No CBM indications are routed to the TE |
| 2 | New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode enabled). New CBMs are not stored in CBM memory |

| *<ds>* | *Description* |
|---|---|
| 0 | No SMS-STATUS-REPORTs are routed to the TE. SMS-STATUS-REPORT is stored in ME/TA |
| 1 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: < length>< CR>< LF>< pdu> (PDU mode enabled). SMS-STATUS-REPORT is not stored in ME/TA |
| 2 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDSI: < mem><index> (PDU mode enabled). SMS-STATUS-REPORT is stored in ME/TA |

Unsolicited Result codes:

+CMT: <length><CR><LF><pdu>
+CMTI: <mem>,<index>
+CBM: <length><CR><LF><pdu>
+CDS: <length><CR><LF><pdu>
+CDSI: <mem><index>

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set new message indication to TE | AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>]]]] | • +CMS ERROR: <err><br>• OK<br>• ERROR |
| Shows the current setting | AT+CNMI? | • +CNMI: <mode>,<mt>,<bm>,<ds><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CNMI=? | • +CNMI: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>s)<br>• OK<br>• ERROR |

Selects the procedure for the way in which new messages received from the network, are indicated to the TE when it is active, e.g. DTR signal is ON. If TE is inactive (DTR signal is OFF), message receiving is carried out as specified in GSM 03.38 (3G TS 23.038).

If the command fails and the error is related to mobile equipment or network, the final result code CMS ERROR: <err> is returned.

| *<mode>* | *Description* |
|---|---|
| 3 | Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode |

| *<mt>* | *Description* |
|---|---|
| 0 | No SMS-DELIVER indications are routed to the TE.<br>No class, Class 0, class 1 and class 3 use <mem3> as preferred storage. Class 2 messages shall be stored in the SIM. If it this is not possible then the MS shall send an error message accordingly to GSM 03.38 |
| 1 | SMS-DELIVER is stored into ME/TA and the indication of the memory location is routed to the TE using unsolicited result code:<br>+CMTI: <mem>,<index> |
| 2 | Class 0, class 1, and class 3 SMS-DELIVERs are routed directly to the TE using the unsolicited result code:<br>+CMT:<oa>, [<alpha>, <scts> [ ,<tooa>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled).<br>About parameters in italics, refer to the show text mode command, +CSDH |
| 3 | Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes +CMT:<oa>, [<alpha>, <scts> [ ,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data > (Text Mode enabled). About parameters in italics, refer to the show text mode command, +CSDH. Messages of other data coding schemes result in indication as defined in <mt>=1 |

| *<bm>* | *Description* |
|---|---|
| 0 | Store message to "BM" (or some manufacturer specific memory). No CBM indications are routed to the TE |
| 2 | New CBMs are routed directly to the TE using unsolicited result code:<br>+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (Text mode enabled) |

| *<ds>* | *Description* |
|---|---|
| 0 | No SMS-STATUS-REPORTs are routed to the TE |
| 1 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: : +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (Text mode enabled). SMS-STATUS-REPORT is not stored in ME/TA |
| 2 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDSI: < mem><index> (Text mode enabled). SMS-STATUS-REPORT is stored in ME/TA |

Unsolicited Result codes:

+CMT:<oa>, [<alpha>, <scts> *[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]*<CR><LF> <data> (Text Mode enabled). Refer to the show text mode command,

+CSDH for information on the parameters in italics.
+CMTI: <mem>,<index>
+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>
+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>
+CDSI: <mem><index>

*Example*

Display cell broadcast messages:

AT+CNMI=3,0,2,0,0

## *13.11 AT+CMGR Read Message*

*PDU Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read message | AT+CMGR=<index> | • *+CMGR: <stat>,[<alpha>],<length>]* <CR><LF><pdu><br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGR=? | • OK<br>• ERROR |

Returns message with location value <index> from preferred message storage <mem1> to the TE. Status of the message and entire message data unit <pdu> is returned. If status of the message is ‘received unread’, status in the storage changes to ‘received read’. If reading fails, final result code +CMS ERROR: <err> is returned.

| *<stat>* | *Description* |
|---|---|
| 0 | Received unread message (i.e. new message) |
| 1 | Received read message |
| 2 | Stored unsent message (only applicable to SMs) |
| 3 | Stored sent message (only applicable to SMs) |

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

| *<alpha>* | *Description* |
|---|---|
| String type | Manufacturing specific. Should be left empty but not omitted |

| *<length>* | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| *<pdu>* | *Description* |
|---|---|
| | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))<br>In the case of CBS: GSM 03.41 TPDU in hexadecimal format |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Read message | AT+CMGR=[<index>] | • **if text mode (+CMGF=1), command successful and SMS-DELIVER:** +CMGR: <stat>,<oa>,[<alpha>],<scts>,[<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data><br>• **if text mode (+CMGF=1), command successful and SMS-SUBMIT:** +CMGR: <stat>,<da>,[<alpha>],*[<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]*<CR><LF><data><br>• **if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:** +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st><br>• **if text mode (+CMGF=1), command successful and SMS-COMMAND:** +CMGR: <stat>,<fo>,<ct>*[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]*<br>• **if text mode (+CMGF=1), command successful and CBM storage:** +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data><br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGR=? | • OK<br>• ERROR |

Returns messages with location index <index> from message storage <mem1> to the TE. About text mode parameters in Italics, refer command Show Text Mode Parameters (+CSDH), If the status of the message is ‘received unread’, status in the storage changes to ‘received read’. If listing fails final result code +CMS ERROR: <err> is returned.

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by <mem1> |

| *<stat>* | *Description* |
|---|---|
| 0 | Received unread message (new message) |
| 1 | Received read message |
| 2 | Stored unsent message (only applicable to SMs) |
| 3 | Stored sent message (only applicable to SMs) |

| *<oa>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Originating-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <tooa> |

| *<da>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <toda> |

| *<toda>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| *<tooa>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>) |

| *<tora>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>) |

| *<alpha>* | *Description* |
|---|---|
| String type | Manufacturing specific. Should be left empty but not omitted, i.e. commas shall mark the place were it should be. Used character set should be the one selected with command Select TE Character Set +CSCS |

| *<scts>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>) |

| *<length>* | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| *<data>* |
|---|
| The entered text should be formatted as follows:<br><br>if <dcs> (set with +CSMP) indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set:<br><br>if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in TS 07.07): ME/TA converts the entered text into GSM alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);<br><br>if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts to 7-bit characters of GSM alphabet (e.g. 17 (IRA 49 and 55) will be converted to character Π (GSM 23));<br><br>if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42);<br><br>sending can be cancelled by giving <ESC> character (IRA 27)<br><ctrl-Z> (IRA 26) must be used to indicate the ending of the message body |

| *<fo>* | *Description* |
|---|---|
| 0 | First octet of SMS-DELIVER in integer format |
| 1 | First octet of SMS_SUBMIT in integer format |
| 2 | First octet of SMS-STATUS-REPORT in integer format |
| 3 | First octet of SMS-COMMAND in integer format |

| *<mr>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Message_Reference |

| *<ra>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Recipient-Address-Value field. BCD (or GSM default alphabet) are converted to characters of the currently selected TE character set (refef command +CSCS. Type of address given by <tosca> |

| *<dt>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Discharge-Time in string format "yy/mm/dd,hh:mm:ss±zz where characters indicate year, month, day, hour,minutes, seconds and time zone |

| *<st>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP-status |

| *<ct>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP--command-type. **Default value is 0** |

| *<sn>* | *Description* |
|---|---|
| Integer | GSM 03.41 CBM serial number |

| *<mid>* | *Description* |
|---|---|
| String type | All different possible combinations of CBM message identifiers (refer <mid>) (default is empty string);<br>e.g. "0,1,5-7"<br><br><mid> GSM 03.41 CBM message identifier in integer format |

| *<page>* | *Description* |
|---|---|
| Integer format | GSM 03.41 CBM page parameter bits 4-7 in integer format |

| *<pages>* | *Description* |
|---|---|
| Integer type | GSM 03.41 CBM page parameter bits 0-3 in integer format |

| *<pid>* | *Description* |
|---|---|
| 0 - 255 | Protocol Identifier in integer format. **Default value is 0**, according to 07.05 section 9.2.3.9 |

| *<dcs>* | *Description* |
|---|---|
| 0 - 255 | Data coding scheme. See GSM 03.48. **UCS2 and compressed text not supported** |

| *<sca>* | *Description* |
|---|---|
| String type | GSM 04.11 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set |

| *<tosca>* | *Description* |
|---|---|
| Integer type | GSM 04.11 RP SC address type-of-address octet in integer format |
| 129 | ISDN/telephony numbering plan, national/international unknown |
| 145 | ISDN/telephony numbering plan, international number |
| 161 | ISDN/telephony numbering plan, national number |
| 128 - 255 | Other values refer to GSM 04.08 section 10.5.4.7 |

| <vp> | Description |
|---|---|
| 0 - 143 | (TP-VP+1) x 5 minutes (i.e. 5 minute intervals up to 12 hous) |
| 144 - 167 | 12 hours + ((TP_VP-143) x 30 minutes) |
| 168 - 196 | (TP-VP-166) x 1 day |
| 197 - 255 | (TP-VP-192) x 1 week |

| <mn> | Description |
|---|---|
| Integer type | GSM 03.40 TP-message-number |

## 13.12 AT+CMGL List Message

*PDU Mode*

| Description | Command | Possible Responses |
|---|---|---|
| List message | AT+CMGL [=<stat>] | • +CMGL: <index>,<stat>,[<alpha>],<length> <CR><LF><pdu>[<CR><LF> +CMGL: <index>,<stat>,[<alpha>],<length> <CR><LF><pdu>[…]] • +CMS ERROR: <err> |
| Show if the command is supported | AT+CMGL=? | • +CMGL: (list of supported <stat>s) |

***Note!*** Returns messages with status value <stat> from preferred message storage <mem1> to the TE. Entire data units <pdu> are returned. If status of the message is ‘received unread’, status in the storage changes to ‘received read’. If listing fails, final result code +CMS ERROR: <err> is returned.

| <stat> | Description |
|---|---|
| 0 | Received unread message (i.e. new message) |
| 1 | Received read message |
| 2 | Stored unsent message (only applicable to SMs) |
| 3 | Stored sent message (only applicable to SMs) |
| 4 | All messages (only applicable to +CMGL command) |

| <index> | Description |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

| *<alpha>* | *Description* |
|---|---|
| String type | Manufacturing specific. Should be left empty but not omitted |

| *<length>* | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

| *<pdu>* | *Description* |
|---|---|
| | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))<br>In the case of CBS: GSM 03.41 TPDU in hexadecimal format |

*Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| List message | AT+CMGL =[<stat>] | • **If text mode (+CMGF=1), command successful and SMS-SUBMITs and SMS-DELIVERs:**<br>+CMGL: <index1>,<stat>,<oa/da>,[<alpha>], [<scts>][,<tooa/toda>,<length>] <CR><LF><data>[<CR><LF><br>+CMGL: <index2>,<stat>,<oa/da>,[<alpha>], [<scts>][,<tooa/toda>,<length>] <CR><LF><data>[…]]<br>• **If text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:**<br>+CMGL: <index1>,<stat>,<fo>,<mr>, [<ra>], [<tora>],<scts>,<dt>,<st> [<CR><LF><br>+CMGL: <index2>,<stat>,<fo>,<mr>,[<ra>], [<tora>],<scts>,<dt>,<st>[…]]<br>• **If text mode (+CMGF=1), command successful and SMS-COMMANDs:**<br>+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF><br>+CMGL: <index>,<stat>,<fo>,<ct>[…]]<br>• **If text mode (+CMGF=1), command successful and CBM storage:**<br>+CMGL: <index>,<stat>,<sn>,<mid>,<page>, <pages>,<CR><LF><data>[<CR><LF><br>+CMGL: <index>,<stat>,<sn>,<mid>,<page>, <pages><CR><LF> <data>[…]]<br>• **Otherwise:**<br>+CMS ERROR: <err> |
| Read the current setting | | • +CMGL:<stat><br>• +CMS ERROR: <err> |
| Test if the command is supported | AT+CMGL=? | • +CMGL: (list of supported <stat>s)<br>• +CMS ERROR: <err> |

Returns messages with status value <stat> from message storage <mem1> to the TE. About text mode parameters in Italics, refer command Show Text Mode Parameters (+CSDH). If the status, of the message is ‘received unread’, status in the storage changes to ‘received read’. If listing fails final result code +CMS ERROR: <err> is returned.

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by <mem1> |

| *<stat>* | *Description* |
|---|---|
| Integer | Indicates the status of messages in memory |
| 0 | Received unread message (new message) |
| 1 | Received read message |
| 2 | Stored unsent message (only applicable to SMs) |
| 3 | Stored sent message (only applicable to SMs) |
| 4 | All messages (only applicable to +CMGL command) |

| *<oa>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Originating-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <tooa> |

| *<da>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-Destination-Address Value in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character (refer command +CSCS). Type of address given by <toda> |

| *<toda>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Destination- Address Type-of-Address octet in integer format (when first character of <da> is +(IRA 43) default is 145, otherwise default is 129 |

| *<tooa>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>) |

| *<tora>* | *Description* |
|---|---|
| String type | GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>) |

| *<alpha>* | *Description* |
|---|---|
| String type | Manufacturing specific. Should be left empty but not omitted i.e. commas shall mark the place were it should be. Used character set should be the one selected with command Select TE Character Set +CSCS |

| *<scts>* | *Description* |
|---|---|
| String type | GSM 03.40 TP-service-centre-time-stamp in time-string format (refer <dt>) |

| <*length*> | *Description* |
|---|---|
| Integer type | Value indicating in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |

<*data*>

The entered text should be formatted as follows:

if <dcs> (set with +CSMP) indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set:

if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in TS 07.07): ME/TA converts the entered text into GSM alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);

if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts to 7-bit characters of GSM alphabet (e.g. 17 (IRA 49 and 55) will be converted to character Π (GSM 23));

if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42);

sending can be cancelled by giving <ESC> character (IRA 27)
<ctrl-Z> (IRA 26) must be used to indicate the ending of the message body

| <*fo*> | *Description* |
|---|---|
| 0 | First octet of SMS-DELIVER in integer format |
| 1 | First octet of SMS_SUBMIT in integer format |
| 2 | First octet of SMS-STATUS-REPORT in integer format |
| 3 | First octet of SMS-COMMAND in integer format |

| <*mr*> | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Message-Reference |

| <*ra*> | *Description* |
|---|---|
| String | GSM 03.40 TP-Recipient-Address-Value field. BCD (or GSM default alphabet) are converted to characters of the currently selected TE character set (refef command +CSCS. Type of address given by <tosca> |

| <*dt*> | *Description* |
|---|---|
| String | GSM 03.40 TP-Discharge-Time in string format "yy/MM/dd,hh:mm:ss+-zz where characters indicate year, month, day, hour,minutes, seconds and time zone |

| *<st>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Status |

| *<ct>* | *Description* |
|---|---|
| Integer | GSM 03.40 TP-Command-Type (default 0) |

| *<sn>* | *Description* |
|---|---|
| Integer | GSM 03.41 CBM Serial Number |

| *<mid>* | *Description* |
|---|---|
| String type | All different possible combinations of CBM message identifiers (refer <mid>) (default is empty string);<br>e.g. "0,1,5-7"<br><br><mid> GSM 03.41 CBM Message Identifier in integer format |

| *<page>* | *Description* |
|---|---|
| Integer format | GSM 03.41 CBM Page Parameter bits 4-7 in integer format |

| *<pages>* | *Description* |
|---|---|
| Integer format | GSM 03.41 CBM Page Parameter bits 0-3 in integer format |

*Example*

AT+CMGF=1
OK

AT+CMGL=?
+CMGL: “REC UNREAD”,“REC READ”,“STO UNSENT”,“STO SENT”,“ALL”

OK

## *13.13 AT+CMGD Delete Message*

*Common for both PDU and Text modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Delete message | AT+CMGD=<index> | • +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CMGD=? | • OK<br>• ERROR |

Deletes message from preferred message storage <mem1> location <index>. If deleting fails, final result code +CMS ERROR: <err> is returned. Test command shows the valid memory locations.

| *<index>* | *Description* |
|---|---|
| Integer type | Value in the range of location numbers supported by the associated memory |

## *13.14 AT+CSDH Show Text Mode Parameters*

*Only Applicable to Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set the show text mode | AT+CSDH=[<show>] | • +CME ERROR: <err><br>• OK |
| Display current settings | AT+CSDH? | • +CSDH: <show><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CSDH=? | • +CSDH: (list of supported <show>s)<br>• OK<br>• +CME ERROR: <err> |

Controls whether detailed header information is shown in text mode result codes.

| *<show>* | *Description* |
|---|---|
| 0 | Do not show header values defined in commands AT+CSCA and AT+CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata> |
| 1 | Show the values in result codes |

## *13.15 AT+CSMP Set Text Mode Parameters*

*Only Applicable to Text Mode*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set the text mode parameters | AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Display current settings | AT+CSMP? | • +CSMP: <fo>,<vp>,<pid>,<dcs><br>• +CME ERROR: <err> |
| Show if the command is supported | AT+CSMP=? | • +CSMP: (List of supported <fo>s), (list of supported <vp>s), (list of supported <pid>s), (list of supported <dcs>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

Used to select values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0… 255). The <pid> parameter identifies the higher protocol being used or indicates interworking with a certain type of telematic service and <dcs> determines the way the information is encoded as in GSM 03.38.

| *<fo>* | *Description* |
|---|---|
| 0-255 | Depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default value 17),SMS-STATUS-REPORT, or SMS-COMMAND (default value 2) in integer format |

| *<vp>* | *Description* |
|---|---|
| 0-143 | (TP-VP+1) x 5 minutes (i.e 5 minutes intervals up to 12 hous) |
| 144-167 | 12 hours + ((TP_VP-143) x 30 minutes) |
| 168-196 | (TP-VP-166) x 1 day |
| 197-255 | (TP-VP-192) x 1 week |

| *<pid>* | *Description* |
|---|---|
| 0-255 | Protocol Identifier in integer format. **Default value is 0**, according to 07.05 section 9.2.3.9 |

| *<dcs>* | *Description* |
|---|---|
| 0-255 | Data coding scheme. See GSM 03.38. **UCS2 and compressed text not supported** |

## *13.16 AT+CSCS Select Character Set*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set command informs TA which character set is used by the TE | AT+CSCS=<chset> | • OK<br>• ERROR |
| Show the current setting | AT+CSCS? | • +CSCS: <chset><br>• OK<br>• ERROR |
| Show list of supported character sets | AT+CSCS=? | • +CSCS: (list of supported <chset>s)<br>• OK<br>• ERROR |

This command informs the TA which character set <chset> is used by the TE. The TA is then able to convert character strings correctly between TE and ME character sets.

When TA-TE interface is set to 8-bit operation and the used TE alphabet is 7-bit, the highest bit shall be set to zero.

***Note!*** How the internal alphabet of ME is converted to, or from, the TE alphabet is manufacturer specific.

Read command shows current setting and test command display conversion schemes implemented in the TA.

| *<chset>* | *Description* |
|---|---|
| “GSM” | GSM default alphabet (GSM 03.38 subclause 6.2.1). **Default value** |
| “IRA” | International reference alphabet (ITU-T T.50). Note: recommended default value by GSM 07.07. |
| “8859-n” | ISO 8859 Latin *n* (1-6) character set |
| “UTF8” | Universal text format, 8 bits |
| “ERICSSON” | Unicode, 16-bit universal multiple-octet coded character set (ISO/IEC10646) |

## *13.17 AT+CSMS Select Message Service*

*Common for both PDU and Text Modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select message service | AT+CSMS=<service> | • +CSMS: <mt>,<mo>,<bm><br>• +CMS ERROR: <err><br>• OK<br>• ERROR |
| Show supported message types along with the current service setting | AT+CSMS? | • +CSMS: <service>,<mt>,<mo>, <bm><br>• OK<br>• ERROR |
| Show list of supported services | AT+CSMS=? | • +CSMS: (list of supported <service>s)<br>• OK<br>• ERROR |

Selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages. If the chosen service is not supported by the ME (but is supported by the TA), final result code +CMS ERROR: <err> is returned.

| *<service>* | *Description* |
|---|---|
| 0 | GSM 03.40 and 03.41. The syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0; Phase 2+ features which do not require new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes) |
| 2..127 | Reserved |

| *<mt>* | *Description* |
|---|---|
| 0 | Mobile terminated messages not supported |
| 1 | Mobile terminated messages supported |

| *<mo>* | *Description* |
|---|---|
| 0 | Mobile originated messages not supported |
| 1 | Mobile originated messages supported |

| *<bm>* | *Description* |
|---|---|
| 0 | Broadcast messages not supported |
| 1 | Broadcast messages supported |

| *<err>* | *Description* |
|---|---|
| 0...127 | GSM 04.11 Annex E-2 values |
| 128...255 | GSM 03.40 subclause 9.2.3.22 values |
| 300 | ME failure |
| 302 | Operation not allowed |
| 304 | Invalid PDU mode parameter |
| 310 | SIM not inserted |
| 311 | SIM PIN required |
| 312 | PH-SIM PIN required |
| 313 | SIM failure |
| 314 | SIM busy |
| 315 | SIM wrong |
| 316 | SIM PUK required |
| 317 | SIM PIN2 required |
| 318 | SIM PUK2 required |
| 500 | Unknown error |
| ...511 | Other values in range 256...511 are reserved |
| 512... | Manufacturer specific |

# 14. Short Message Services - Cell Broadcast

## *14.1 AT+CNMI New Message Indications to TE*

See 13.10, AT+CNMI New Message Indications to TE

## *14.2 AT+CSCB Select Cell Broadcast Message Type*

*Common for both PDU and text modes*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Select cell broadcast message type | AT+CSCB=[<mode> [,<mids>]] | • +CMS ERROR: <err><br>• OK<br>• ERROR |
| Shows the current setting | AT+CSCB? | • +CSCB: <mode>,<mids><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CSCB=? | • +CSCB: (list of supported <mode>s)<br>• OK<br>• ERROR |

Selects which types of CBMs are to be received by the ME.

| *<mode>* | *Description* |
|---|---|
| 0 | Message types in <mids> and <dcss> are accepted |

| *<mids>* | *Description* |
|---|---|
| string type | All different possible combinations of CBM message identifiers (refer <mid>) (default is empty string);<br>e.g. “0,1,5-7”<br><br><mid> GSM 03.41 CBM Message Identifier in integer format |

# 15. SIM Application Toolkit

## *15.1 AT+CPIN PIN Control*

See 3.23, AT+CPIN PIN Control

## *15.2 AT*E2STKS SIM Application Toolkit Settings*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Set the presentation of the unsolicited result codes corresponding to STK | AT*E2STKS=<on_off> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Read the current status of the presentation of the unsolicited result codes | AT*E2STKS? | • *E2STKS: <on_off><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKS=? | • *E2STKD: list of supported <on_off><br>• +CME ERROR <err><br>• OK<br>• ERROR |

Allows the external application to disable or enable the presentation of the unsolicited result codes corresponding to the STK commands. Parameter <on_off> is used to disable or enable the presentation of an unsolicited result code *E2STK. Setting chosen is stored internally so that it is not necessary to change it each time the ME is switched on.

If the presentation of the unsolicited result codes is disabled, the messages below are not sent to the application.

The unsolicited result codes shall be disabled by default.

| *<on_off>* | *Description* |
|---|---|
| 0 | Disable the presentation of the unsolicited result codes related to STK. **Default value** |
| 1 | Enable the presentation of the unsolicited result codes related to STK |

Unsolicited Result Codes:

The unsolicited result codes defined in sections below can be received.

## *15.3 AT*E2STKD M2M STK Display Text*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of DISPLAY TEXT | AT*E2STKD=<answer> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKD=? | • *E2STKD: (list of supported <answer>)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within DISPLAY TEXT command to the external application by means of the unsolicited result code *E2STKD.

Command AT*E2STKD allows the external application to send the appropriate answer after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is generated.

Test command returns the list of supported <answer>. Values follow GSM 11.14 standard

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required: the text was displayed and cleared as requested. It corresponds to '00' Command performed successfully, described in the GSM standard |
| 1 | Failed.<br>User Terminated Session: the text was displayed as requested and the user wants to end the proactive session. It corresponds to '10' Proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backwards move: the text was displayed as requested and the user wants to go backwards in the session. It corresponds to '11' Backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user: the text was displayed, and although the clear condition was "Wait for user to clear", the user did not react. It corresponds to '12' no response from user |
| 4 | Failed.<br>Screen is busy: the text could not be displayed |

Unsolicited Result Codes:

*E2STKD: <priority>,<clear_condition>,<coding>,<text_length>, <text>

Values follow GSM 11.14 standard.

| <*priority*> | *Description* |
|---|---|
| 0 | Display normal priority text |
| 1 | Display high priority text |

| <*clear_condition*> | *Description* |
|---|---|
| 0 | Clear message after a dalay |
| 1 | Wait for user to clear message |

| <*coding*> | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| <*text_length*> | *Description* |
|---|---|
| Integter type | Value indicating the maximum length of field <text> |

| <*text*> | *Description* |
|---|---|
| string type | Field of maximum length <text_length>, in string type format between "". Coding is defined in <coding> |

## *15.4 AT*E2STKG M2M STK Get Inkey*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of GET INKEY | AT*E2STKG =<answer>, [<response_type>, <user_response>] | • +CME ERROR <err><br>• OK |
| Test if the command is supported | AT*E2STKG=? | • *E2STKG: (list of supported <answer>), (list of supported <response_type>), <user_response><br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within GET INKEY command to the external application by means of the unsolicited result code E2STKG.

The external application then sends AT*E2STKG with the user response.

Answer command allows the external application to send the appropriate answer, after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is generated.

If <answer> parameter is not 0, a failure has occurred and no more parameters are sent. If the extra parameters are sent, the ME indicates ERROR.

Test command returns the list of supported values, and the maximum value of <prompt_text_length>.

Values follow GSM 11.14 standard.

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required: the text was displayed. It corresponds to '00' Command performed successfully, described in the GSM standard |
| 1 | Failed.<br>User Terminated Session: the text was displayed as requested and the user wants to end the proactive session. It corresponds to '10' Proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backward move: the text was displayed as requested and the user wants to go backwards in the session. It corresponds to '11' Backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user: the text was displayed, and the user did not react. It corresponds to '12' No response from user |
| 4 | Failed.<br>Screen is busy: the text could not be displayed |

| *<response_type>* | *Description* |
|---|---|
| 0 | Response type shall be digits (0-9, *, # and +) |
| 1 | Response type shall be SMS default alphabet |
| 3 | Response type shall be "Yes/No" response |

| *<user_response>* | *Description* |
|---|---|
| String type | Field of 1 to 2 bytes length in string type format between "". Coding is defined in <response_type>. Length shall be 2 bytes when coding is UCS2 . Otherwise it shall be 1 byte |

Unsolicited Result Codes:

*E2STKG: <coding>,<prompt_text_length>,<prompt_text>

Values follow GSM 11.14 standard.

| <*coding*> | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| <*prompt_text_length*> | *Description* |
|---|---|
| Integer type (0-235) | Value indicating the maximum length of field <prompt_text> |

| <*prompt_text*> | *Description* |
|---|---|
| String type | Field of maximum length <prompt_text_length>, in string type format between “”. Coding is defined in <prompt_coding>. |

## *15.5 AT*E2STKI M2M STK Get Input*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of GET INPUT | AT*E2STKI=<answer>, [<response_type>, <response_length>, <user_response>] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKI=? | • *E2STKI: (list of supported <answer>),(list of supported <response_type>), <response_length>, <user_response><br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within GET INPUT command to the external application by means of the unsolicited result code E2STKI. The external application sends AT*E2STKI with the user response.

AT*E2STKI allows the external application to send the appropriate answer after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is generated.

If <answer> parameter is not 0, a failure has occurred and no more parameters are sent. If the extra parameters are sent, the ME indicates ERROR.

Test command returns the list of suported values, and <prompt_text_length>.

Values follow GSM 11.14 standard.

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required: the text was displayed. It corresponds to '00' command performed succesfully, described in the GSM standard |
| 1 | Failed.<br>User terminated session: the text was displayed as requested and the user wants to end the proactive session. It corresponds to '10' proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backward move: the text was displayed as requested and the user wants to go backwards in the session. It corresponds to '11' backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user: the text was displayed, and the user did not react. It corresponds to '12' No response from user |
| 4 | Failed.<br>Screen is busy: the text could not be displayed |

| *<response_type>* | *Description* |
|---|---|
| 0 | Response type shall be digits (0-9, *, # and +) |
| 1 | Response type shall be SMS default alphabet |
| 3 | Response type shall be "Yes/No" response |

| *<response_length>* | *Description* |
|---|---|
| Integer type (0-160) | Value indicating the length of response field <user_response>. It shall be an integer within the range between <min_length_response> and <max_length_response> |

| *<user_response>* | *Description* |
|---|---|
| String type | Field of length between <min_length_response> and <max_length_response>, in string type format between "".<br>Coding is defined in <response_type>. |

***Note!*** If <response_type>=3 (Yes/No), the length of <user_response> is 1 byte. Otherwise, the ME gives an ERROR message.

Unsolicited Result Codes:

*E2STKI: <min_length_response>,<max_length_response>, <echo_input>,<prompt_coding>,<prompt_text_length>, <prompt_text>

Values follow GSM 11.14 standard.

| *<min_length_response>* | *Description* |
|---|---|
| Integer type (0-160) | Value indicating the minimum length of response field <user_response> |

| *<max_length_response>* | *Description* |
|---|---|
| Integer type (0-160) | Value indicating the maximum length of response field <user_response> |

| *<echo_input>* | *Description* |
|---|---|
| 0 | The user input shall be echoed |
| 1 | The user input shall be hidden |

| *<prompt_coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |
| 2 | Text is coded in UCS2 alphabet, as defined in GSM 03.38. It corresponds to data coding scheme of 16 bit UCS2 alphabet |

| *<prompt_text_length>* | *Description* |
|---|---|
| Integer type | Value indicating the maximum length of field <prompt_text> |

| *<prompt_text>* | *Description* |
|---|---|
| String type | Field of maximum length <prompt_text_length>, in string type between “”. Coding is defined in <prompt_coding> |

## *15.6 AT*E2STKL M2M STK Select Item*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of SELECT ITEM | AT*E2STKL=<answer>, [<user_response>] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKL=? | • *E2STKL: (list of supported <answer>),<br>(list of supported <user_response>)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within SELECT ITEM command to the external application by means of the unsolicited result code *E2STKL.

Command AT*E2STKL allows the external application to send the appropriate answer after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is be generated.

If <answer> parameter is not 0, a failure has occurred and no more parameters are sent. If the extra parameters are sent, the ME indicates ERROR.

Values follow GSM 11.14 standard.

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required. It corresponds to '00' command performed succesfully, described in the GSM standard |
| 1 | Failed.<br>User terminated session. It corresponds to '10' Proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backwards move. It corresponds to '11' Backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user. It corresponds to '12' no response from user |
| 4 | Failed.<br>Screen is busy: the text could not be displayed |

| *<user_response>* | *Description* |
|---|---|
| integer type | The identifier is a single byte between 1 and 255. It identifies the selected <item_idn> within the items list |

Unsolicited Result Codes:

E2STKL: <NbrOfItems>,<coding>,<text_length>,<alpha_id> [,<default>]<CR><LF>E2STKL: <item_id1>,<coding>, <text_length>,<item1><CR><LF>[…]E2STKL: <item_idn>, <coding>,<text_length>,<itemn><CR><LF>]

Values follow GSM 11.14 standard.

| *<coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| *<text_length>* | *Description* |
|---|---|
| Integer type (0-240) | Value indicating the maximum length of field <alpha_id>, <itemn1>,.<Itemn> |

| *<alpha_id>* | *Description* |
|---|---|
| String type | Field of string type between “”. Coding is according to $EF_{AND}$ as defined in GSM 11.11 |

The maximum length is fixed

| *<default>* | *Description* |
|---|---|
| Integer type | The <default> parameter is a single byte between 1 and 255. It shows the default/selected item within the list |

| *<item_idn>* | *Description* |
|---|---|
| Integer type | The identifier is a single byte between 1 and 255. Each item <itemn> in the list shall have a unique identifer <item_idn> |

| *<itemn>* | *Description* |
|---|---|
| String type | Field of string type between “”. Coding is according to $EF_{AND}$ as defined in GSM 11.11 |

| *<NbrOfItems>* | *Description* |
|---|---|
| Integer type | Number of items to be presented in the following unsolicited results |

The maximum length is fixed.

## *15.7 AT*E2STKM M2M STK Set Up Menu*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of SET UP MENU | AT*E2STKM=<answer>, <on_off> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKM=? | • *E2STKM: (list of supported <answer>),(list of supported <on_off>)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within SET UP MENU command to the external application, so that the STK menu can be built externally, by means of the unsolicited result code *E2STKM.

The current menu can be removed by sending only the parameter <on_off> = 0.

Answer command allows the external application to send the appropriate answer after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is generated.

Values follow GSM 11.14 standard.

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required: it corresponds to '00' command performed successfully, described in the GSM standard |
| 1 | Failed.<br>User Terminated Session: the command was executed as requested and the user wants to end the proactive session. It corresponds to '10' proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backwards move: the command was executed as requested and the user wants to go backwards in the session. It corresponds to '11' backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user: the command was executed, and the user did not react. It corresponds to '12' no response from user |
| 4 | Failed.<br>Screen is busy |
| 5 | Failed.<br>Command beyond MEs capability. It corresponds to '30'. It was not possible to successfully integrate or remove the list of menu items |

| <*on_off*> | *Description* |
|---|---|
| 0 | Remove the current menu |
| 1 | New menu to be displayed |

Unsolicited Result Codes:

*E2STKM: <NbrOfItems>,<coding>,<text_length>, <alpha_id><CR><LF>E2STKM: <item_id1>,<coding>, <text_length>,<item1>[<CR><LF>[…]E2STKM: <item_idn>, <coding>,<text_length>,<itemn>]

Values follow GSM 11.14 standard.

| <*coding*> | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| <*text_length*> | *Description* |
|---|---|
| Integer type | Value indicating the maximum length of field <alpha_id>, <itemn1>, <Itemn> |

| <*alpha_id*> | *Description* |
|---|---|
| String type | Field of string type between "". Coding is according to $EF_{AND}$ as defined in GSM 11.11 |

The maximum length is fixed.

| <*item_idn*> | *Description* |
|---|---|
| Integer type | The identifier is a single byte between 1 and 255. Each item <itemn> in the list shall have a unique identifer <item_idn> |

| <*itemn*> | *Description* |
|---|---|
| String type | Field of string type format between “”. Coding is according to $EF_{AND}$ as defined in GSM 11.11 |

| <*NbrOfItems*> | *Description* |
|---|---|
| Integer type | Number of Items to be presented in the following unsolicited results |

The maximum length is fixed.

The parameters have no default values.

## *15.8 AT*E2STKN M2M STK Envelope (Menu Selection)*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Do the menu selection | AT*E2STKN=<sel_item> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKN=? | • *E2STKN: (list of supported <sel_item>)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

The application informs the ME about the selected menu item by means of the AT*E2SKTN command. The ME answers with OK, or ERROR.

The Do command allows the external application to select the menu item in the item list that was created by means of the SET-UP MENU command.

| *<sel_item>* | *Description* |
|---|---|
| Integer type | The identifier is a single byte between 1 and 255. It identifies the selected menu item corresponding to SET-UP MENU command. Values follow the definition described in GSM 11.14 |

## *15.9 AT*E2STKC M2M STK Set Up Call*

| *Description* | *Command* | *Possible responses* |
|---|---|---|
| Answer to the reception of SET UP CALL | AT*E2STKC=<answer> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*E2STKC=? | • *E2STKC: (list of supported <answer>)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

The ME passes the parameters within SET UP CALL command to the external application by means of the unsolicited result code *E2STKC, so that it takes up the decision on progressing or rejecting the call.

Answer command allows the external application to send the appropriate answer after receiving the unsolicited result code, and before the timeout expires.

If Answer command is sent once the timeout expires, an ERROR response is generated.

Values follow GSM 11.14 standard.

| *<answer>* | *Description* |
|---|---|
| 0 | OK.<br>Performed as required. It corresponds to ‘00’ command performed succesfully, described in the GSM standard |
| 1 | Failed.<br>User terminated session. It corresponds to ‘10’ Proactive session terminated by the user, described in the GSM standard |
| 2 | Failed.<br>User requests backwards move. It corresponds to ‘11’ backward move in the proactive SIM session requested by the user |
| 3 | Failed.<br>No response from user. It corresponds to ‘12’ no response from user |
| 4 | Failed.<br>Screen is busy: the text could not be displayed |
| 6 | Failed.<br>User rejected call set-up request. It corresponds to ‘22’ |
| 7 | Failed.<br>User cleared down call before connection or network release. It corresponds to ‘23’ |

Unsolicited Result Codes:

*E2STKC: <ton>,<dial_string>,<SetUpRequirement>,<coding>, <text_length>,<alpha_id>

Values follow GSM 11.14 standard.

| *<ton>* | *Description* |
|---|---|
| Integer type | Field of 1 byte indicating the Type of Number, coded as for $EF_{AND}$. See GSM 04-08, section 10.5.4.7 for the allowed values |

| *<dial_string>* | *Description* |
|---|---|
| String type | Phone number of format <ton> |

| *<coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| *<text_length>* | *Description* |
|---|---|
| Integer type (0-240) | Value indicating the maximum length of field <alpha_id> |

| *<alpha_id>* | *Description* |
|---|---|
| String type | Field of string type between "". Coding is according to $EF_{AND}$ as defined in GSM 11.11 |

The maximum length is fixed

## *15.10 *E2STKE STK Send Short Message*

Unsolicited Result Code:

*E2STKE: <coding>, < text_length >, <alpha_id>

The ME passes the <alpha_id> within SEND SHORT MESSAGE command to the external application, by means of the unsolicited result code *E2STKE. This informs the external application that the ME is sending an SMS.

| *<coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7 bit GSM default alphabet |

| *<text_length>* | *Description* |
|---|---|
| Integer type (0-240) | Value indicating the maximum length of field <alpha_id> |

| *<alpha_id>* | *Description* |
|---|---|
| String type | Field of string type format between "". Coding is according to $EF_{AND}$ as defined in GSM 11.11 |
| 'FF' | In case that the SIM does not provide the optional alpha identifier, or this is a null data object, the ME shall give 'FF' to indicate "Sending SMS", so that the external application is informed |

The maximum length is fixed.

## *15.11 *E2STKP STK Send SS*

Unsolicited Result Code:

*E2STKP: <ton>, <SS_string>, <coding>, <text_length>, <alpha_id>, <SS_return>

The ME passes the parameters within SEND SS command to the external application, by means of the unsolicited result code *E2STKP. This informs the external application that the ME has sent an SS string to the network, and provides the current status after this operation.

| *<ton>* | *Description* |
|---|---|
| integer type | Field of 1 byte indicating the Type of Number, coded as for $EF_{AND}$. See GSM 04-08, section 10.5.4.7 for the allowed values |

| *<SS_string>* | *Description* |
|---|---|
| String type | SS string of format <ton> |

| *<coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7-bit GSM default alphabet |

| *<text_length>* | *Description* |
|---|---|
| Integer type (0-240) | Value indicating the maximum length of field <alpha_id> |

| *<alpha_id>* | *Description* |
|---|---|
| String type | Field of string type format between “”. Coding is according to $EF_{AND}$ as defined in GSM 11.11 |
| ‘FF’ | In case that the SIM does not provide the optional alpha identifier, or this is a null data object, the ME shall give ‘FF’ to indicate “SS string sent” so that the external application is informed |

The maximum length is fixed.

| *<SS_return>* | *Description* |
|---|---|
| Integer type | Field of 1 byte indicating the SS Return Result Operation code, as defined in GSM 04.80, so that the external application is informed about the result of the SS operation |

## *15.12 *E2STKU STK Send USSD*

Unsolicited Result Code:

*E2STKU: <coding>, <text_length>, <alpha_id>

Description:

The ME shall passes the <alpha_id> parameter within SEND USSD command to the external application, by means of the unsolicited result code *E2STKU. This informs the external application that the ME is sending a USSD string to the network.

| *<coding>* | *Description* |
|---|---|
| 0 | Text is coded in unpacked format, using the SMS default 7-bit coded alphabet, as defined in GSM 03.38 with bit 8 set to 0. It corresponds to data coding scheme of 8 bit |
| 1 | Text is coded in packed format, using the SMS default 7-bit coded alphabet, packed in 8-bit octets, as defined in GSM 03.38. It corresponds to data coding scheme of 7-bit GSM default alphabet |

| *<text_length>* | *Description* |
|---|---|
| Integer type (0-240) | Value indicating the maximum length of field <alpha_id> |

| *<alpha_id>* | *Description* |
|---|---|
| String type | Field of string type format between "". Coding is according to $EF_{AND}$ as defined in GSM 11.11 |
| 'FF' | In case that the SIM does not provide the optional alpha identifier, or this is a null data object, the ME shall give 'FF' to indicate "SS string sent" so that the external application is informed |

The maximum length is fixed.

## *15.13 *E2STKR STK Refresh*

Unsolicited Result Code:

*E2STKR: <indicator>

The ME informs the external application about the coming REFRESH command, by means of the unsolicited result code *E2STKR (eg Reset is coming).

| *<indicator>* | *Description* |
|---|---|
| Integer type | Indicator describes the mode that the SIM has requested when sending a REFRESH command |
| 0 | SIM initialization and full file change notification |
| 1 | File change notification |
| 2 | SIM initialization and file change notification |
| 3 | SIM initialization |
| 4 | SIM reset |

## *15.14 AT*E2STKTO SIM Application Toolkit Settings*

Parameter Command Syntax:

AT*E2STKTO = <Command>, <timer>

This command allows the external application to configure some general settings related to STK.

Defined values:

Parameter <Command> is used to define the command that the time parameter is going to be applied.

Parameter <timer> is used to fix the timeout period applicable to Proactive SIM mechanism.

| *<Command>* | *Description* |
|---|---|
| Integer type (0-6) | It defines the command that the time parameter is going to be applied |
| 0 | All the commands with timeout associated are set to the value of <timer> |
| 1 | Set Up Menu command timeout is set to the value of <timer> |
| 2 | Set Up Call command timeout is set to the value of <timer> |
| 3 | Display Text command timeout is set to the value of <timer> |
| 4 | Get Input command timeout is set to the value of <timer> |
| 5 | Select Item command timeout is set to the value of <timer> |

| *<timer>* | *Description* |
|---|---|
| Integer type (0-99) | Specifies the value in seconds to be set in the timeout associated with the command specified in <command> |
| 0 | All the commands timeouts are set to its default value |
| (1-99) | The timeout of the command specified in <command> is set to this value |

Unsolicited result code:

*E2STKTO: <command>

# 16. Supplementary Services

## *16.1 AT+CPIN PIN Control*

See 3.23, AT+CPIN PIN Control

## *16.2 AT+CACM Accumulated Call Meter*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Reset the ACM (Accumulated Call Meter) value on the SIM | AT+CACM=[<passwd>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show the current value | AT+CACM? | • +CACM: <acm><br>+CME ERROR: <err><br>• OK<br>• ERROR |
| Tests if the command is supported | AT+CACM=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

Resets the Advice of Charge related accumulated call meter value in SIM file $EF_{ACM}$. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is usually required to reset the value. If setting fails in an ME error, +CME ERROR: <err> is returned. See “+CME ERROR (Mobile Equipment Error Code)”, page 57.

***Note!*** This command must take into account what line is chosen with AT*ELIN.

Read command returns the current value of ACM.

| *<passwd>* | *Description* |
|---|---|
| String type | SIM-PIN2 |

| *<acm>* | *Description* |
|---|---|
| String type | Accumulated call meter value similarly coded as <ccm> under +CAOC |

## *16.3 AT+CAMM Accumulated Call Meter Maximum*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set command sets the Advice of Charge related accumulated call meter maximum value in SIM file $EF_{ACMmax}$ | AT+CAMM=[<acmmax>[,<passwd>]] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current value | AT+CAMM? | • +CAMM: <acmmax><br>+CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command if supported | AT+CAMM=? | • +CME ERROR: <err><br>• OK<br>• ERROR |

Sets the Advice of Charge related accumulated call meter maximum value in SIM file $EF_{ACMmax}$. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM (refer +CACM) reaches ACMmax calls are prohibited. SIM PIN2 is usually required to set the value. If setting fails in an ME error, +CME ERROR: <err> is returned.

Read command returns the current value of ACMmax.

| *<acmmax>* | *Description* |
|---|---|
| String type | Accumulated call meter maximum value similarly coded as <ccm> under +CAOC; value zero disables ACMmax feature |

| *<passwd>* | *Description* |
|---|---|
| String type | SIM PIN2 |

## *16.4 AT+CAOC Advice of Charge*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Execute command | AT+CAOC[=<mode>] | • [+CAOC: <ccm>]<br>*+CME ERROR: <err>*<br>• *OK*<br>• *ERROR* |
| Read command, shows the current mode | AT+CAOC? | • +CAOC: <mode><br>• OK<br>• ERROR |
| Test command, shows if the command is supported | AT+CAOC=? | • [+CAOC: (list of supported <mode>s]<br>• OK<br>• ERROR |

Use of Advice of Charge supplementary service command enables the subscriber to get information about the cost of calls. With <mode>=0, the execute command returns the current call meter value from the ME. The command also includes the possibility to enable an unsolicited event reporting of the CCM information. The unsolicited result code +CCCM: <ccm> is sent when the CCM value changes, but no more than every 10 seconds. Deactivation of the unsolicited event reporting is made with the same command.

Read command indicates whether the unsolicited reporting is activated or not. Read command is available when the unsolicited result code is supported.

It is recommended (although optional) that the test command return the supported mode values.

| *<mode>* | *Description* |
|---|---|
| 0 | Query CCM value |
| 1 | Deactivate the unsolicited reporting of CCM value |
| 2 | Activate the unsolicited reporting of CCM value |

| *<ccm>* | *Description* |
|---|---|
| String type | Three bytes of the current call meter value in hexadecimal format (e.g. “00001E” indicates decimal value 30); value is in home units and bytes are similarly coded as ACMmax value in the SIM |

## *16.5 AT+CPUC Price Per Unit and Currency Table*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set command sets the parameters of Advice of Charge related price per unit and currency table in SIM file $EF_{PUCT}$ | AT+CPUC=<currency>,<ppu>[,<passwd>] | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Shows the current values | AT+CPUC? | • +CPUC: <currency>,<ppu><br>+CME ERROR: <err><br>• OK<br>• ERROR |
| Shows if the command is supported | AT+CPUC=? | • OK<br>• ERROR |

Sets the parameters of Advice of Charge related price per unit and currency table in SIM file $EF_{PUCT}$. PUCT information can be used to convert the home units (as used in +CAOC, +CACM and +CAMM) into currency units. SIM PIN1 or SIM PIN2 (depending on which SIM card that is used) is required to set the parameters. If setting fails in an ME error, +CME ERROR: <err> is returned.

Read command returns the current parameters of PUCT.

For information on the character set see AT+CSCS in the Short Message Services section.

| *<currency>* | *Description* |
|---|---|
| String | Alpha-identifier of the currency code (3 characters, e.g. SEK) |

| *<ppu>* | *Description* |
|---|---|
| String type | price per unit; dot is used as a decimal separator (e.g. "2.66") |

| *<passwd>* | *Description* |
|---|---|
| String type | SIM PIN1 or SIM PIN2 |

## *16.6 AT*EDIF Ericsson Divert Function*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Enable and disable notification with the unsolicited result code *EDIF | AT*EDIF=<onoff> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Show the current setting | AT*EDIF? | • *EDIF: <onoff><br>+CME ERROR: <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT*EDIF=? | • *EDIF: (list of supported <onoff>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command enables and disables notification of divert status changes with the unsolicited result code *EDIF.

| *<onoff>* | *Description* |
|---|---|
| 0 | Disable notification with the unsolicited result code *EDIF |
| 1 | Enable notification with the unsolicited result code *EDIF |

Unsolicited Result Codes:

*EDIF: <reason>,<status>,<classx>[,<number>,<type>]

## *16.7 AT*EIPS Identity Presentation Set*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Sets the alpha tag to be displayed in the ME | AT*EIPS=<ID>, <alphatag mode> | • +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current setting | AT*EIPS? | • *EIPS: <ID1>,<alphatag mode1><CR><LF> *EIPS: <ID2>,<alphatag mode2><CR><LF><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported and list the possible settings | AT*EIPS=? | • *EIPS: (list of supported ID>s),(list of supported <alphatag mode>s)<br>• +CME ERROR: <err><br>• OK<br>• ERROR |

This command enables or disables the presentation of the alpha tag of the Caller ID and Called ID to the TE if the ID is recognized. The alpha tag is the first name and the last name. The presentation is done by an unsolicited result code, *ELIP for Caller ID and *EOLP for Called ID.

| *<ID>* | *Description* |
|---|---|
| 1 | Caller ID (*ELIP) |
| 2 | Called ID (*EOLP) |

| *<alphatag mode>* | *Description* |
|---|---|
| 0 | Off |
| 1 | First name and last name displayed |

Unsolicited Result Codes:

*ELIP:<alpha tag>

*EOLP:<alpha tag>

## *16.8 AT*ELIN Ericsson Line Set*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set the current line to <line> | AT*ELIN=<line> | • *ELIN: <line><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Read the current line | AT*ELIN? | • *ELIN: <line><br>• +CME ERROR: <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT*ELIN=? | • *ELIN: list of supported <line>s<br>+CME ERROR: <err><br>• OK<br>• ERROR |

This command requests the ME to set the current line to <line>.

***Note!*** The following command reads its value from the current line and is thus affected by the use of *ELIN:

AT+CACM - Accumulated Call Meter

| *<line>* | *Description* |
|---|---|
| 1 | L1 |
| 2 | L2 |

## *16.9 AT*E2SSD M2M Supplementary Service Dispatch*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Send Supplementary Service command | AT*E2SSD=<SS_String> | • OK<br>• ERROR |
| Shows if the command is supported | AT*E2SSD=? | • OK<br>• ERROR |

This command allows the user to send a Public MMI command string in order to activate, deactivate, interrogate or modify settings for Supplementary Services.

Once a string is sent, the command will return OK if parsed and sent successfully, otherwise ERROR is returned. The command does not verify that the operation executes successfully - use the AT*E2SSI command to gain feedback of the operation status.

Refer to GSM 02.30 for Public MMI services and codes.

| *<SS_String>* | *Description* |
|---|---|
| String Type | String in double quotes, containing a Public MMI command to modify, activate, interrogate or deactivate a Supplementary Service. String can contain values '0-9', '*' and '#' |

## *16.10 AT*E2SSI M2M Supplementary Service Indications*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Set Supplementary Service indications | AT*E2SSI=<op> | • ERROR<br>• OK |
| Displays current settings | AT*E2SSI? | *E2SSI: <op> |
| Shows if the command is supported | AT*E2SSI=? | • *E2SSI: (list of supported <op>s)<br>• ERROR |

This command allows the user to display the unsolicited response code *E2SSI on network responses (either command confirmation or error responses) for Supplementary Services. This can be used in conjunction with the AT+CSSN command which gives responses on the network notification of SS status.

The default setting is OFF, where responses are disabled.

| *<op>* | *Description* |
|---|---|
| 0 | Disable *E2SSI indications. **Default value** |
| 1 | Enable *E2SSI indications |

Unsolicited Result codes:

*E2SSI: <errorcode>[,<Opcode>[,<SS_Code>,[<BasicServChoice>, <BasicServValue>],[<SS_Status>],[<ForwardedToNr>], [<NoReplyConditionTime>], [<CLI_RestrictionOption>]]]

or

*E2SSI: <errorcode>[,<Opcode>[,<SS_Code>,[<BasicServChoice>, <BasicServValue>],[<SS_Status>],[<SubscriptionOption>]]]

| *<errorcode>* | *Description* |
|---|---|
| 0 | OK (no error) |
| 1 | SSI_PASSWORD_ERROR |
| 2 | SSI_TOO_MANY_PARTS |
| 3 | SSI_COMMAND_ERROR |
| 4 | SSI_SIM_ERROR |

| *<errorcode>* | *Description* |
|---|---|
| 5 | SSI_NUMBER_ERR |
| 6 | SSI_CALL_BARRED |
| 7 | SSI_NOT_AVAILABLE |
| 8 | SSI_UNSUCCESSFUL |
| 9 | SSI_NOT_ALLOWED |
| 10 | SSI_NETWORK_PROBLEM |

| *<Opcode>* | *Description* |
|---|---|
| 10 | REGISTER_SS |
| 11 | ERASE_SS |
| 12 | ACTIVATE_SS |
| 13 | DEACTIVATE_SS |
| 14 | INTERROGATE_SS |

| *<SScode>* | *Description* |
|---|---|
| 0 | ALL_SS |
| 16 | ALL_LINE_IDENTIFICATION_SERVICES |
| 17 | CALLING_LINE_IDENTIFICATION_PRESENTATION |
| 18 | CALLING_LINE_IDENTIFICATION_RESTRICTION |
| 19 | CONNECTED_LINE_IDENTIFICATION_PRESENTATION |
| 20 | CONNECTED_LINE_IDENTIFICATION_RESTRICTION |
| 21 | MALICIOUS_CALL_IDENTIFICATION |
| 32 | ALL_FORWARDING_SERVICES |
| 33 | CALL_FORWARDING_UNCONDITIONAL |
| 40 | ALL_CONDITIONAL_FORWARDING_SERVICES |
| 41 | CALL_FORWARDING_ON_MOBILE_SUBSCRIBER_BUSY |
| 42 | CALL_FORWARDING_ON_NO_REPLY |
| 43 | CALL_FORWARDING_ON_SUBSCRIBER_NOT_REACHABLE |
| 49 | EXPLICIT_CALL_TRANSFER |
| 64 | ALL_CALL_COMPLETION_SERVICES |
| 65 | CALL_WAITING |
| 66 | CALL_HOLD |
| 67 | COMPLETION_OF_CALL_TO_BUSY_SUBSCRIBER |
| 81 | MULTI_PARTY |

| *<SScode>* | *Description* |
|---|---|
| 112 | ALL_CHARGING_SS |
| 113 | ADVICE_OF_CHARGE_INFORMATION |
| 114 | ADVICE_OF_CHARGE_CHARGING |
| 144 | ALL_BARRING_SERVICES |
| 145 | BARRING_OF_OUTGOING_CALLS |
| 146 | BARRING_OF_ALL_OUTGOING_CALLS |
| 147 | BARRING_OF_ALL_OUTGOING_INTERNATIONAL_CALLS |
| 148 | BARRING_OF_ALL_OG_INTERNATIONAL_NON_HPLMN_DIRECTED_CALLS |
| 153 | BARRING_OF_INCOMING_CALLS |
| 154 | BARRING_OF_ALL_INCOMING_CALLS |
| 155 | BARRING_OF_ALL_IC_CALLS_WHEN_OUTSIDE_HPLMN |

| *<BasicServChoice>* | *Description* |
|---|---|
| 2 | BEARER_SERVICE |
| 3 | TELE_SERVICE |

| *<BasicServValue>* | *Description* | |
|---|---|---|
| | *<TELE_SERVICE>* | *<BEARER_SERVICE>* |
| 0 | TS_ALL_TELE_SERVICES | BS_ALL_BEARER_SERVICES |
| 16 | TS_SPEECH | BS_ALL_DATA_CDA_SERVICES |
| 17 | TS_TELEPHONY | BS_DATA_CDA_300BPS |
| 18 | TS_EMERGENCY_CALLS | BS_DATA_CDA_1200BPS |
| 20 | | BS_DATA_CDA_2400BPS |
| 21 | | BS_DATA_CDA_4800BPS |
| 22 | | BS_DATA_CDA_9600BPS |
| 24 | | BS_ALL_DATA_CDS_SERVICES |
| 25 | | BS_DATA_CDS_300BPS |
| 26 | | BS_DATA_CDS_1200BPS |
| 28 | | BS_DATA_CDS_2400BPS |
| 29 | | BS_DATA_CDS_4800BPS |
| 30 | | BS_DATA_CDS_9600BPS |
| 32 | TS_ALL_SHORT_MESSAGE_SERVICES | BS_ALL_PAD_ACCESS_CA_SERVICES |

| *<BasicServValue>* | *Description* | |
|---|---|---|
| | *<TELE_SERVICE>* | *<BEARER_SERVICE>* |
| 33 | TS_SHORT_MESSAGE_MT_PP | BS_PAD_ACCESS_CA_300BPS |
| 34 | TS_SHORT_MESSAGE_MO_PP | BS_PAD_ACCESS_CA_1200BPS |
| 35 | | BS_PAD_ACCESS_CA_1200_75BPS |
| 36 | | BS_PAD_ACCESS_CA_2400BPS |
| 37 | | BS_PAD_ACCESS_CA_4800BPS |
| 38 | | BS_PAD_ACCESS_CA_9600BPS |
| 40 | | BS_ALL_DATA_PDS_SERVICES |
| 44 | | BS_DATA_PDS_2400BPS |
| 45 | | BS_DATA_PDS_4800BPS |
| 46 | | BS_DATA_PDS_9600BPS |
| 48 | | BS_ALL_ALTERNATE_SPEECH_DATA_CDA |
| 56 | | BS_ALL_ALTERNATE_SPEECH_DATA_CDS |
| 64 | TS_VIDEOTEX | BS_ALL_SPEECH_FOLLOWED_BY_DATA_CDA |
| 72 | | BS_ALL_SPEECH_FOLLOWED_BY_DATA_CDS |
| 80 | TS_TELETEX | BS_ALL_DATA_CIRCUIT_ASYNCHRONOUS |
| 88 | | BS_ALL_DATA_CIRCUIT_SYNCHRONOUS |
| 96 | TS_ALL_FAX_SERVICES | BS_ALL_ASYNCHRONOUS_SERVICES |
| 97 | TS_FAX_GROUP3_ALTER_SPEECH | |
| 98 | TS_AUTOMATIC_FAX_GROUP3 | |
| 99 | TS_FAX_GROUP4 | |
| 104 | | BS_ALL_SYNCHRONOUS_SERVICES |
| 112 | TS_ALL_DATA_SERVICES | |
| 120 | | BS_12_KBIT_UNRESTRICTED_DIGITAL |
| 128 | TS_ALL_TELESERVICES_EXCEPT_SMS | |
| 208 | TS_AUXILIARY_SPEECH | |
| 209 | TS_AUXILIARY_TELEPHONY | |

| *<SS_Status>* | *Description* |
|---|---|
| 0 | NO_FLAG_SET |
| 1 | SS_STATUS_ACTIVE |
| 2 | SS_STATUS_REGISTERED |

| *<SS_Status>* | *Description* |
|---|---|
| 4 | SS_STATUS_PROVISIONED |
| 7 | SS_STATUS_PRA |

| *<ForwardedToNr>* | *Description* |
|---|---|
| String | Phone number string in double quotes |

| *<NoReplyConditionTime>* | *Description* |
|---|---|
| 0-65532 | Integer value for time |

| *<CLI_Restriction Option>* | *Description* |
|---|---|
| 0 | PERMANENT |
| 1 | TEMPORARY_DEFAULT_RESTRICTED |
| 2 | TEMPORARY_DEFAULT_ALLOWED |

| *<Subscription Option>* | *Description* |
|---|---|
| 1 | OVERRIDE_CATEGORY |
| 2 | CLI_RESTRICTION_OPTION |
| 5 | RESTRICTION_PER_CALL |

## *16.11 AT+CCFC Call Forwarding number and Conditions*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request Calling forwarding number and conditions | AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<satype>]]]] | • +CME ERROR <err><br>• when <mode>=2 and command successful:<br>+CCFC: <status>,<class1>[,<number>,<type>[,<satype>]][<CR><LF>+CCFC: <status>,<class2>[,<number>,<type>[,<satype>]][...]]<br>• OK<br>• ERROR |
| Show if the command is supported | AT+CCFC=? | • + CCFC: (list of supported <reason>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

This command allows control of the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported. When querying the status of a network service (<mode>=2) the response line for ‘not active’ case (<status>=0) should be returned only if service is not active for any <class>.

| *<reason>* | *Description* |
|---|---|
| 0 | Unconditional |
| 1 | Mobile busy |
| 2 | No reply |
| 3 | Not reachable |
| 4 | All call forwarding |
| 5 | All conditional call forwarding |

| *<mode>* | *Description* |
|---|---|
| 0 | Disable |
| 1 | Enable |
| 2 | Query status |
| 3 | Registration |
| 4 | Erasure |

| *<number>* | *Description* |
|---|---|
| string type | String type phone number of forwarding address in format specified by <type> |

| *<type>* | *Description* |
|---|---|
| integer format | Type of address octet |
| 129 | ISDN/telephony numbering plan, national/international unknown. **Default value if '+' is not in <sca>** |
| 145 | ISDN/telephony numbering plan, international number. **Default value if '+' is in <sca>** |
| 161 | ISDN/telephony numbering plan, national number |
| 128 - 255 | Other values |

| *<satype>* | *Description* |
|---|---|
| integer format | Type of subaddress octet |
| 128 | NSAP (X.213/ISO 8348 AD2), even number of address signals |
| 136 | NSAP (X.213/ISO 8348 AD2), odd number of address signals |
| 160 | User defined, even number of address signals |
| 168 | User defined, odd number of address signals |
| 128 - 255 | Other values reserved |

| *<classx>* | *Description* |
|---|---|
| integer | Sum of integers each representing a class of information. **Default value is 7** |
| 1 | Voice L1 |
| 2 | Data |
| 4 | Fax |
| 8 | Short message service |
| 16 | Data circuit sync |
| 32 | Data circuit async |
| 64 | Dedicated packet access |
| 128 | Dedicated PAD access |

| *<status>* | *Description* |
|---|---|
| 0 | Not active |
| 1 | Active |

## *16.12 AT+CCWA Call Waiting*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request call waiting | AT+CCWA=[<n> [,<mode> [,<class>]]] | • when<mode>=2 and command successful:<br>+CCWA:<status>,<class1>[<CR><LF><br>+CCWA: <status>,<class2>[…]]<br>+CME ERROR <err><br>• OK<br>• ERROR |
| Show the current setting | AT+CCWA? | • +CCWA: <n><br>+CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CCWA=? | • +CCWA: (list of supported <n>s)<br>+CME ERROR <err><br>• OK<br>• ERROR |

This command allows control of the call waiting supplementary service according to 3GPP TS 22.083. Activation, deactivation and status query are supported. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>. Parameter <n> is used to disable or enable the presentation of an unsolicited result code +CCWA: <number>,<type>,<class>,[<alpha>][,<CLI validity>] to the TE when call waiting service is enabled. The command is abortable when the network is interrogated.

The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards.

Test command returns values supported by the TA as a compound value.

| *<n>* | *Description* |
|---|---|
| 0 | Disable |
| 1 | Enable |

| *<mode>* | *Description* |
|---|---|
| 0 | Disable |
| 1 | Enable |
| 2 | Query status |

| *<classx>* | *Description* |
|---|---|
| integer | Sum of integers each representing a class of information. **Default value is 7** |
| 1 | Voice L1 |
| 2 | Data |
| 4 | Fax |
| 8 | Short message service |
| 16 | Data circuit sync |
| 32 | Data circuit async |
| 64 | Dedicated packet access |
| 128 | Dedicated PAD access |

| *<status>* | *Description* |
|---|---|
| 0 | Not active |
| 1 | Active |

| *<number>* | *Description* |
|---|---|
| String type | String type phone number of forwarding address in format specified by <type> |

| *<type>* | *Description* |
|---|---|
| Integer format | Type of address octet in integer format (GSM 04.08 10.5.4.7) |

| *<err>* | *Description* |
|---|---|
| 0 | Phone failure |
| 3 | Operation not allowed |
| 4 | Operation not supported |
| 21 | Invalid index |
| 30 | No network service |
| 31 | Network timeout |
| 100 | Unknown |

Unsolicited Result Codes:

+CCWA: <number>, <type>, <class>

## *16.13 AT+CHLD Call Hold and Multiparty*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request call related supplementary services | AT+CHLD=<n> | • +CME ERROR <err><br>• OK<br>• ERROR |
| Show if the command is supported | AT+CHLD=? | • +CHLD: (list of supported <n>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

This command allows control of the following call related services:

- a call can be temporarily disconnected from the ME but the connection is retained by the network;
- multiparty conversation (conference calls);
- the served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection.

Calls can be put on hold, recovered, released, added to conversation, and transferred similarly as defined in 3GPP TS 22.030.

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; refer 3GPP TS 22.083 clause 2), MPTY (MultiParty; refer 3GPP TS 22.084) and ECT (Explicit Call Transfer; refer 3GPP TS 22.091). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards.

***Note!*** Call Hold and MultiParty are only applicable to teleservice 11.

It is recommended (although optional) that test command returns a list of operations which are supported. The call number required by some operations is denoted by “x” (e.g. +CHLD: (0,0x,1,1x,2,2x,3)).

| *<n>* | *Description* |
|---|---|
| ... | Integer type; equals to numbers entered before SEND button in GSM 02.30 subclause 4.5.5.1 |
| 0 | Releases all held calls or sets User Determined User Busy (UDUB) for a waiting call |
| 0X | Releases a specific call X from a held multiparty call |
| 1 | Releases all active calls (if any exist) and accepts the other (held or waiting) call |
| 1X | Releases a specific active call X |

| <n> | *Description* |
|---|---|
| 2 | Places all active calls (if any exist) on hold and accepts the other (held or waiting) call |
| 2X | Places all active calls on hold, except call X with which communication is supported |
| 3 | Adds a held call to the conversation |
| 4 | Connects the two calls and disconnects the subscriber from both calls (explicit call transfer) |

"X" is the numbering (starting with 1) of the call given by the sequence of setting up or receiving the calls (active, held or waiting) as seen by the served subscriber. Calls hold their number until they are released. New calls take the lowest available number. Where both a held and a waiting call exists, the above procedures shall apply to the waiting call (i.e. not to the held call) in conflicting situation.

***Note!*** The "directory number" case shall be handled with dial command D, and the END case with hangup command H (or +CHUP).

## *16.14 AT+CLIP Call Line Identification Presentation*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Requests calling line identification. | AT+CLIP=<n> | OK |
| Read the current setting | AT+CLIP? | +CLIP: <n>,<m> |
| Show if the command is supported | AT+CLIP=? | +CLIP: (list of supported <n>s) |

This command enables a called subscriber to get the identity of the calling line when receiving a mobile terminated call. The "Set" command enables or disables the presentation of the CLI (calling line identity) at the TE. It has no effect on the execution of the supplementary service CLIP in the network.

When the presentation of the CLI at the TE is enabled (if the calling subscriber has allowed it), the unsolicited result code +CLIP:<number>,<type>,,,<alpha> response is returned after every RING (or +CRING:<type>) result code sent from TA to TE (refer to AT +CRC in section ???????).Whether this will be used when a normal voice call is answered is a manufacturer-specific option.

| <n> | *Description* |
|---|---|
| 0 | Disables presentation. **Default value** |
| 1 | Enables presentation |

| <*m*> | *Description* |
|---|---|
| 0 | CLIP not provisioned |
| 1 | CLIP provisioned |
| 2 | Unknown (e.g. no network) |

Unsolicited Result codes:

+CLIP: <number>, <type>,,,<alpha>

Defined values:

| <*number*> | *Description* |
|---|---|
| String | Type phone number of format specified by <type> type of address octet in integer format (refer to GSM 04.08, sub-clause 10.5.4.7) |

| <*type*> | *Description* |
|---|---|
| 129 | 129 ISDN/telephony numbering plan, national/international unknown |
| 145 | 145 ISDN/telephony numbering plan, international number |
| 161 | 161 ISDN/telephony numbering plan, national number |
| 128-255 | Other values refer to GSM 04.08 section 10.5.4.7 |

## *16.15 AT+CLIR Calling Line Identification Restriction*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request calling line identification restriction | AT+CLIR=[<n>] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Read the current setting | AT+CLIR? | • +CLIR: <n>,<m><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CLIR=? | • +CLIR: (list of supported <n>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

This command refers to CLIR-service according to GSM 02.81 that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call.

Set command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. Using the opposite command can

revoke this adjustment. If this command is used by a subscriber without provision of CLIR in permanent mode the network will act according GSM 02.81.

The setting shall be per logical channel.

When the MS is turned off and then turned on again the parameter setting <n> shall turn back to default, i.e. the presentation of CLI shall be used according to the subscription of the CLIR service, <n> is 0.

Read command gives the default adjustment for all outgoing calls (given in <n>), and also triggers an interrogation of the provision status of the CLIR service (given in <m>).

Test command returns values supported by the TA as a compound value.

***Note!*** On a per call base CLIR functionality is explained in subclause "ITU-T V.25ter dial command".

| *<n>* | *Description* |
|---|---|
| 0 | Presentation indicator is used according to the subscription of the CLIR service |
| 1 | CLIR invocation |
| 2 | CLIR suppression |

| *<m>* | *Description* |
|---|---|
| 0 | CLIR not provisioned |
| 1 | CLIR provisioned in permanent mode |
| 2 | Unknown (e.g. no network) |
| 3 | CLIR temporary mode presentation restricted |
| 4 | CLIR temporary mode presentation allowed |

## *16.16 AT+CSSN Supplementary Service Notification*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Presentation of notification result codes from TA to TE | AT+CSSN=[<n>[,<m>]] | • +CME ERROR <err><br>• OK<br>• ERROR |
| Read the current setting | AT+CSSN? | • +CSSN: <n>,<m><br>• +CME ERROR <err><br>• OK<br>• ERROR |
| Test if the command is supported | AT+CSSN=? | • +CSSN: (list of supported <n>s),(list of supported <m>s)<br>• +CME ERROR <err><br>• OK<br>• ERROR |

This command refers to supplementary service related network initiated notifications. The set command enables or disables the presentation of notification result codes from TA to TE.

When <n>=1 and a supplementary service notification is received after a mobile originated call setup, unsolicited result code +CSSI: <code1>[,<index>] is sent to TE before any other MO call setup result codes presented in this ETS or in V.25ter. When several different <code1>s are received from the network, each of them shall have its own +CSSI result code.

When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, or when a forward check supplementary service notification is received, unsolicited result code +CSSU: <code2>[,<index>] is sent to TE. In case of MT call setup, result code is sent after every +CLIP result code (refer command “Calling line identification presentation +CLIP”) and when several different <code2>s are received from the network, each of them shall have its own +CSSU result code.

***Note!*** The difference between <index> and <cindex> is that <index> is a position mark while <cindex> is a unique value for each CUG. <index> is not supported.

Test command returns values supported by the TA as a compound value.

| *<n>* | *Description* |
|---|---|
| 0 | Disable the +CSSI result code presentation status in the TA |
| 1 | Enable the +CSSI result code presentation status in the TA |

| *<m>* | *Description* |
|---|---|
| 0 | Disable the +CSSU result code presentation status in the TA |
| 1 | Enable the +CSSU result code presentation status in the TA |

| *<code1>* | *Description* |
|---|---|
| 0 | Unconditional call forwarding is active |
| 1 | Some of the conditional call forwarding are active |
| 2 | Call has been forwarded |
| 3 | Call is waiting |
| 4 | This is a CUG call (also <index> present) |
| 5 | Outgoing calls are barred |
| 6 | Incoming calls are barred |
| 7 | CLIR suppression rejected |

| *<index>* | *Description* |
|---|---|
| 0…9 | CUG index |
| 10 | No index (preferred CUG taken from subscriber data) |

| *<code2>* | *Description* |
|---|---|
| 0 | This is a forwarded call (MT call setup) |
| 1 | This is a CUG call (also <index> present) (MT call setup) |
| 2 | Call has been put on hold (during a voice call) |
| 3 | Call has been retrieved (during a voice call) |
| 4 | Multiparty call entered (during a voice call) |
| 5 | Call on hold has been released (this is not a SS notification) (during a voice call) |
| 6 | Forward check SS message received (can be received whenever) |
| 10 | Incoming call has been forwarded |

## *16.17 AT+CUSD Unstructured Supplementary Service Data*

| *Description* | *Command* | *Possible Responses* |
|---|---|---|
| Request unstructured supplementary service data | AT+CUSD=[<n>[,<str>]] | • +CME ERROR: <err><br>• OK |
| Show supported message types along with the current service setting | AT+CUSD? | • +CUSD: <n><br>• OK<br>• ERROR |
| Show list of supported services | AT+CUSD=? | • +CUSD: (list of supported <n>s)<br>• OK<br>• ERROR |

This command allows control of the Unstructured Supplementary Service Data (USSD) according to GSM 02.90. Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) +CUSD: <m>[,<str>,<dcs>] to the TE. In addition, value <n>=2 is used to cancel an ongoing USSD session. If <n> is not given then the default value 0 is taken.

When <str> is given, a mobile initiated USSD string or a response USSD string to a network initiated operation is sent to the network. The response USSD string from the network is returned in a subsequent unsolicited +CUSD: result code.

The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

Test command returns values supported by the TA as a compound value.

Some different scenarios are shown below:

- An incoming network initiated USSD-Notify should be presented to the external application as an unsolicited result code +CUSD: if the external application has enabled result code presentation.
- An incoming USSD-request asking for a reply should sent to the external application as an unsolicited result code +CUSD: if the external application has enabled result code.
- If the external application answers to the request with the command AT+CUSD then the ME sends the answer to the network.
- A USSD-request sent with the command AT+CUSD from the external application.

The different alternatives are shown below.

| | *Network* | *Mobile Equipment* | *External application* |
|---|---|---|---|
| 1 | Signal | Sends unsolicited result code +CUSD | Result code presentation enabled, presented |
| 2 | Signal asking for reply | Sends unsolicited result code +CUSD | Result code presentation enabled, presented |
| 3 | | | Answer AT+CUSD |
| 3b | | | Sends AT+CUSD |

| *<n>* | *Description* |
|---|---|
| 0 | Disable result code presentation in the TA |
| 1 | Enable result code presentation in the TA |
| 2 | Terminate (abort) USSD dialogue. This value is not applicable to the read command response |

| *<str>* | *Description* |
|---|---|
| string | String type USSD (when <str> parameter is not given, network is not interrogated):<br><br>-If <dcs> indicates that GSM 03.38 default alphabet is used:<br><br>*if TE character set other than "HEX" (refer command Select TE Character Set +CSCS): ME/TA converts GSM alphabet into current TE character set according to rules of GSM 07.05 Annex A |

*Example 1*

| *AT Command* | *Result Code* | *Description* |
|---|---|---|
| AT+CUSD=1,"*34#" | | Enable the Result Code presentation in the TAE and send a USSD-request |
| | +CUSD:1,"id code" OK | Further user action required, give id code |
| AT+CUSD=1,"7465338" | | Id code given |
| | +CUSD:0 OK | No further user action required |

*Example 2*

| *AT Command* | *Result Code* | *Description* |
|---|---|---|
| | +CUSD:0,“Expensive incoming call” | Incoming USSD-notify telling the user that the incoming call is expensive |

*Example 3*

| *AT Command* | *Result Code* | *Description* |
|---|---|---|
| AT+CUSD=1,“*55*0700#” | | Enable the Result Code presentation in the TAE and send a USSD-request asking for an alarm at the time 07:00 |
| | +CUSD:0,“ALARM” | At 07:00 the network sends an alarm to the user |

# 17. Alphabetical Listing of AT Commands


| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| AT | Attention Command | 131 |
| AT&C | Circuit 109 (DCD) Control | 135 |
| AT&D | Circuit 108 (DTR) Response | 135 |
| AT&F | Set to Factory Defined Configuration | 131 |
| AT&S | Circuit 107 (DSR) Response | 136 |
| AT&W | Store User Profile | 131 |
| AT* | List all Supported AT Commands | 132 |
| AT*E2APR | M2M Audio Profile Manipulation | 97 |
| AT*E2CD | Ericsson M2M Cell Description | 145 |
| AT*E2EAMS | Ericsson M2M Audio Profile Modification | 91 |
| AT*E2EMM | Ericsson M2M Engineering Monitoring Mode | 147 |
| AT*E2ESC | M2M Escape Sequence Guard Time | 143 |
| AT*E2FAX | Ericsson M2M Fax Comm. Baud Rate Modification | 129 |
| AT*E2NBTS | Ericsson M2M Neighbour BTS | 165 |
| AT*E2PBCS | Ericsson M2M Phonebook Check Sum | 167 |
| AT*E2SPN | M2M Service Provider Indication | 152 |
| AT*E2SSD | M2M Supplementary Service Dispatch | 239 |
| AT*E2SSI | M2M Supplementary Service Indications | 240 |
| AT*E2SSN | Ericsson M2M SIM Serial Number | 155 |
| AT*E2STKC | M2M STK Set Up Call | 226 |
| AT*E2STKD | M2M STK Display Text | 216 |
| AT*E2STKG | M2M STK Get Inkey | 217 |
| AT*E2STKI | M2M STK Get Input | 219 |
| AT*E2STKL | M2M STK Select Item | 222 |
| AT*E2STKM | M2M STK Set Up Menu | 224 |
| AT*E2STKN | M2M STK Envelope (Menu Selection) | 226 |
| AT*E2STKS | SIM Application Toolkit Settings | 215 |
| AT*E2STKTO | SIM Application Toolkit Settings | 231 |

| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| AT*EALR | Ericsson Audio Line Request | 99 |
| AT*EALS | Ericsson Request ALS Status | 153 |
| AT*EAMS | Ericsson Audio Mode Selection | 100 |
| AT*EARS | Ericsson Audio Ring Signal | 101 |
| AT*ECAM | Ericsson Call Monitoring | 74 |
| AT*ECPI | Ciphering Indicator | 163 |
| AT*ECSP | Ericsson Customer Service Profile | 153 |
| AT*EDIF | Ericsson Divert Function | 237 |
| AT*EDST | Ericsson Daylight Saving Time | 75 |
| AT*EGIR | Ericsson Group Item Read | 172 |
| AT*EIPS | Identity Presentation Set | 238 |
| AT*ELAM | Ericsson Local Audio Mode | 102 |
| AT*ELIN | Ericsson Line Set | 239 |
| AT*EMAR | Ericsson Master Reset | 76 |
| AT*EMIC | Ericsson Microphone Mode | 102 |
| AT*EMIR | Ericsson Music Mute Indication Request | 103 |
| AT*EPEE | Ericsson Pin Event | 76 |
| AT*EPNR | Ericsson Read SIM Preferred Network | 154 |
| AT*EPNW | Ericsson Write SIM Preferred Network | 155 |
| AT*ESAG | Ericsson Add to Group | 167 |
| AT*ESCG | Ericsson Create Group | 168 |
| AT*ESCN | Ericsson Set Credit Card Number | 169 |
| AT*ESDG | Ericsson Delete Group | 170 |
| AT*ESDI | Ericsson Delete Group Item | 171 |
| AT*ESGR | Ericsson Group Read | 171 |
| AT*ESLN | Ericsson Set Line Name | 156 |
| AT*ESNU | Ericsson Settings Number | 173 |
| AT*EXVC | Ericsson SET External Volume Control | 103 |
| AT+CACM | Accumulated Call Meter | 233 |
| AT+CAMM | Accumulated Call Meter Maximum | 234 |
| AT+CAOC | Advice of Charge | 235 |
| AT+CBST | Select Bearer Service Type | 105 |
| AT+CCFC | Call Forwarding Number and Conditions | 245 |

| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| AT+CCLK | Set Clock and Date | 77 |
| AT+CCWA | Call Waiting | 247 |
| AT+CEER | Extended Error Report | 77 |
| AT+CFUN | Set Phone Functionality | 78 |
| AT+CGACT | PDP Context Activate or Deactivate | 109 |
| AT+CGATT | GPRS Attach or Detach | 110 |
| AT+CGDATA | Enter Data State | 111 |
| AT+CGDCONT | Define PDP Context | 112 |
| AT+CGEREP | GPRS Event Reporting | 114 |
| AT+CGMI | Read MS Manufacturer Identification | 132 |
| AT+CGMM | Read MS Model Identification | 132 |
| AT+CGMR | Read MS Revision Identification | 133 |
| AT+CGPADDR | Show PDP Address | 115 |
| AT+CGQMIN | Quality of Service Profile (Minimum Acceptable) | 116 |
| AT+CGQREQ | Quality of Service Profile (Requested) | 118 |
| AT+CGREG | GPRS Network Registration Status | 121 |
| AT+CGSMS | Select Service for MO SMS Messages | 122 |
| AT+CGSN | Read MS Product Serial Number Identification | 133 |
| AT+CHLD | Call Hold and Multiparty | 249 |
| AT+CHSC | HSCSD Current Call Parameters | 123 |
| AT+CHSD | HSCSD Device Parameters | 124 |
| AT+CHSN | HSCSD Non Transparent Call Configuration | 125 |
| AT+CHSR | HSCSD Parameters Report | 126 |
| AT+CHSU | HSCSD Automatic User Initiated Upgrading | 127 |
| AT+CHUP | Hang Up Call | 65 |
| AT+CIMI | Subscriber Identification | 157 |
| AT+CIND | Indicator Control | 79 |
| AT+CLAC | List All Available AT Commands | 80 |
| AT+CLCK | Facility Lock | 157 |
| AT+CLIP | Calling Line Identification | 250 |
| AT+CLIR | Calling Line Identification Restriction | 251 |
| AT+CMEE | Mobile Equipment Error | 80 |
| AT+CMER | Mobile Equipment Event Reporting | 81 |

| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| AT+CMGC | Send Command | 189 |
| AT+CMGD | Delete Message | 207 |
| AT+CMGF | Message Format | 182 |
| AT+CMGL | List Message | 201 |
| AT+CMGR | Read Message | 195 |
| AT+CMGS | Send Message | 184 |
| AT+CMGW | Write Message to Memory | 182 |
| AT+CMOD | Call Mode | 66 |
| AT+CMSS | Send From Storage | 188 |
| AT+CMUX | Switch to 07.10 Multiplex Protocol | 139 |
| AT+CNMI | New Message Indications to TE | 192 |
| AT+CNUM | Subscriber Number | 159 |
| AT+COLP | Connected Line Identification Presentation | 160 |
| AT+COPS | Operator Selection | 161 |
| AT+CPAS | Phone Activity Status | 82 |
| AT+CPBF | Phonebook Find | 174 |
| AT+CPBR | Phonebook Read | 174 |
| AT+CPBS | Phone Storage | 176 |
| AT+CPBW | Phonebook Write | 177 |
| AT+CPIN | PIN Control | 83 |
| AT+CPMS | Preferred Message Storage | 179 |
| AT+CPUC | Price Per Unit and Currency Table | 236 |
| AT+CPWD | Change Password | 84 |
| AT+CR | Service Reporting Control | 86 |
| AT+CRC | Cellular Result Code | 87 |
| AT+CREG | Network Registration | 162 |
| AT+CRES | Restore SMS Settings | 140 |
| AT+CRLP | Radio Link Protocol | 106 |
| AT+CSAS | Save Settings | 87 |
| AT+CSCA | Service Centre Address | 181 |
| AT+CSCB | Select Cell Broadcast Message Type | 213 |
| AT+CSCS | Select Character Set | 209 |
| AT+CSDH | Show Text Mode Parameters | 207 |

| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| AT+CSMP | Set Text Mode Parameters | 208 |
| AT+CSMS | Select Message Service | 210 |
| AT+CSQ | Signal Strength | 88 |
| AT+CSSN | Supplementary Service Notification | 253 |
| AT+CTZU | Automatic Time Zone Update | 89 |
| AT+CUSD | Unstructured Supplementary Service Data | 255 |
| AT+CVHU | Voice Hang-Up | 67 |
| “AT+F____” | Low Level Fax Commands | 130 |
| AT+GCAP | Request Modem Capabilities List | 134 |
| AT+ICF | Cable Interface Character Format | 141 |
| AT+IFC | DTE-DCE Local Flow Control | 141 |
| AT+ILRR | Cable Interface Local Rate Reporting | 142 |
| AT+IPR | Cable Interface Port Command | 143 |
| AT+VTS | DTMF and Tone Generation | 67 |
| AT+WS46 | Mode Selection | 136 |
| ATA | Answer | 61 |
| ATD | Dial | 62 |
| ATE | Command Echo | 137 |
| ATH | Hang up | 63 |
| ATI | Identification Information | 133 |
| ATO | Return to Online Data Mode | 64 |
| ATP | Select Pulse Dialling | 64 |
| ATQ | Result Code Suppression | 69 |
| ATS0 | Automatic Answer Control | 69 |
| ATS2 | Escape Sequence Character | 70 |
| ATS3 | Command Line Termination Character | 70 |
| ATS4 | Response Formatting Character | 71 |
| ATS5 | Command Line Editing Character (BACKSPACE) | 72 |
| ATS6 | Blind Dial Delay Control | 72 |
| ATS7 | Connection Completion Timeout | 72 |
| ATS8 | Comma Dial Modifier Delay Control | 72 |
| ATS10 | Automatic Disconnect Delay Control | 74 |

| *AT Command* | *Description* | *Page No.* |
|---|---|---|
| ATT | Select Tone Dialling | 64 |
| ATV | DCE Response Format | 137 |
| ATX | Call Progress Monitoring Control | 65 |
| ATZ | Reset to Default Configuration | 138 |

| *Unsolicited Result Code* | *Description* | *Page No.* |
|---|---|---|
| *E2STKE | STK Send Short Message | 228 |
| *E2STKP | STK Send SS | 229 |
| *E2STKR | STK Refresh | 231 |
| *E2STKU | STK Send USSD | 229 |